Bombay Branch Royal Asiatic Society
16 April 1851

THE

BOMBAY ENGINEERS' REPORT

FOR THE

OFFICIAL YEAR 1848-49;

COMPRISING REPORTS FROM

LIEUTENANT COLONEL C. W. GRANT, CAPTAINS H. J. MARGARY, P. L. HART, W. G. HEBBERT, AND W. D. GRAHAM.

Bombay:

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1850.

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ACCOUNT OF THE EXPENDITURE

IN THE

GARRISON ENGINEER'S DEPARTMENT,

FOR

THE YEAR 1848-49.

Bombay, 1st May 1849.

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Annual Repairs.						
Making annual repairs to the public buildings occupied by troops, &c., in the Castle, Fort George, Garrison, Esplanade, Colabah, and at Out-posts..	14,786	3	11			
Petty Repairs.						
Making petty repairs to the public buildings occupied by troops, &c., in the Castle, Fort George, Garrison, Esplanade, Colabah, and at Out-posts..	5,474	10	4			
				20,260	14	3
Certain Works.						
Making a new entrance through the Bastion to the Sewree Fort, and converting the present entrance into a Magazine....	275	0	0			
Whitewashing the whole of the buildings occupied by the Wing of Her Majesty's 8th Regiment at Colabah..	694	11	0			
Putting up a ceiling to the office room of the Assistant Garrison Engineer..	101	12	0			
Cleaning out the Fort ditch, and caulking the sluice gates	164	0	8			
Repairing the roofs of the Government bake-house	23	5	11			
Repairing the stable slope leading into it from the road belonging to the Military Pay Office..	36	0	0			
Repairing and whitewashing the store rooms, &c., at the Government Cooperage..	126	6	0			
Carried forward, Rs.....	1,421	3	7	20,260	14	3

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	1,421	3	7	20,260	14	3
Repairing the well and stable at Sion Fort.....	90	8	0			
Repairing the road leading to the Officers' Quarters, and the Mess-house at Colabah..	317	13	0			
Renewing the present boarding, and building a new facing of Porebunder stone to the Ball-court of the Town Barracks..	143	7	11			
Building a wall at the Marine Battalion Line, N. I., on the Esplanade....	680	0	0			
Constructing a chimney to the furnace in the Gun Carriage Manufactory, and a door in the Foundry..	411	15	1			
Sinking a well outside the tank in Fort George..	32	11	8			
Making palisade railing, &c., in the gorge of Hodge's Ravelin..	425	0	0			
Constructing open verandahs for the protection of the fire engines in charge of the 26th Regiment N. I., and Marine Battalion	95	9	0			
Supplying with water the troops quartered on Colabah, by laying down pipes from the wells in the neighbourhood of the Cooperage..	14,646	15	5			
Constructing a temporary shed for the sentinel of Her Majesty's 22nd Regiment at Colabah..	51	6	0			
Constructing two masonry platforms for pivot guns, on the left flank of the Colabah Barracks.	168	9	8			
Making alterations to the Serjeant's quarters, &c., of the Rowlee Hill Magazine...	107	0	0			
Making alterations to the Artillery Hospital in Fort George	65	7	0			
Extending the compound of the Sanatarium and the Native Garrison Hospital	206	0	0			
Making alterations and improvements to the Brigade Hospital at the Presidency..	344	0	0			
Constructing four plank partitions, and a corresponding number of doors, to the privy for Natives at the Gun Carriage Department..	63	9	0			
Putting nine glass windows to the Mess-room at Colabah	98	0	0			
Making alterations, and opening sky-lights, to the Turners' shed in the Gun Carriage Department at Colabah	880	0	0			
Constructing a verandah to the prisoners' room in Fort George	150	0	0			
Draining the Native Lines at Boreebunder.	975	0	0			
Dispatching 3,000 teak rafters to Kurrachee, from Nigra Bunder, six miles below Nagotna.	400	0	0			
Making alterations and additions to effect a communication between the Petty Stores and Sail-makers' workshop in the Grand Arsenal	70	0	0			
Renewing the boarded floor of the light ammunition room in the Grand Arsenal....	100	0	0			
Carried forward, Rs.....	21,944	3	4	20,260	14	3

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	21,944	3	4	20,260	14	3
Fitting glass windows to the quarters occupied by the Adjutant of the 22nd Regiment N. I., at Boreebunder	150	0	0			
Constructing a tank and oven for copperising timber..	68	0	11			
Rebuilding the charcoal cylinder furnace, Mazagon Powder-works..	75	0	0			
Putting a shed over the well in the compound of the 22nd Regiment N. I..	20	0	0			
Hammallage and boat hire, &c., for conveying the wood and iron works of the Barracks to Hydrabad in Scinde	21	2	0			
Making a bed of masonry, composed of one stone, in the Artificers' yard in the Grand Arsenal..	4	0	0			
Substituting iron net work for wire gauze to the doors and windows of the Laboratory in the Grand Arsenal	184	0	0			
Putting up two punkas in the Military Board Office.	49	0	0			
Making alterations to the stable attached to Major Greathed's bungalow at Colabah ...;	93	11	0			
Constructing a bed of masonry in which to fix the crane in the Foundry of the Gun Carriage Department	75	0	0			
				22,684	1	3
Buildings.						
Erecting three solitary cells, and privy, with surrounding palisade rails, and a new Guard-room, near the Depôt Barracks at Colabah. ..	3,500	0	0			
Erecting two lightning conductors to the Gunpowder Magazine situated on the brow of Rowlee Hill, near Sion	193	0	0			
Preparing doors and windows for the buildings appertaining to the new European Barracks at Hydrabad in Scinde	403	0	0			
Supplying wood works of framed and unframed timber for various buildings for a Troop of Horse Artillery at Kurrachee	129	9	4			
Preparing the wood work required for the Horse Artillery buildings at Kurrachee	833	8	3			
Supplying wood work required for the roof of the Canteen, Library, and Quarter Guard to the new European Barracks at Hydrabad in Scinde..	602	10	9			
Preparing the wood work for four trusses required for the Artillery Barracks at Kurrachee....	73	0	0			
Preparing the frameworks for doors and windows of the temporary pendalls at Kurrachee..	1,609	9	8			
				7,434	6	0
Carried forward, Rs. ..	.....			50,379	5	6

Names of Works.	Total.		
	Rs.	*a.*	*p.*
Brought forward, Rs....	50,379	5	6
Levelling the Esplanade, supplying water to the Dhobees, annual repairs to the Dhobeewada, and expenses in collecting the Esplanade fees, &c.	8,007	3	2
Amount paid to artificers and labourers engaged for, or returning from out-stations	25,399	15	5
Total, Rupees Eighty-three Thousand Seven Hundred and Eighty-six, Annas Eight, and Pie One..	83,786	8	1

(Signed) H. J. MARGARY, Capt.,
Acting Garrison Engineer at the Presidency.

Statement of the Sums expended by the Garrison Engineer at the Presidency, from 1st May 1848 to 30th April 1849.

Names of Officers.	Annual and Petty Repairs.	Certain Works.	Buildings.	Expended from Esplanade Fund.	Expended for Artificers and Labourers engaged for or returning from Out-stations.	Total.
	Rs. a. p.	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*
Captain J. H. G. Crawford, Captain H. J. Willoughby, and Captain H. J. Margary, Garrison Engineers at the Presidency.....	20,260 14 3	22,684 1 3	7,434 6 0	8,007 3 2	25,399 15 5	83,786 8 1

Statement showing the Cost of Engineering and General Superintendence of the Garrison Engineer's Department, for the above period.

Names of Officers.	Expense of Establishment per Annum.	Expenditure.	Rate per Cent.
	Rs. a. p.	*Rs. a. p.*	
Captain J. H. G. Crawford, Captain H. J. Willoughby, and Captain H. J. Margary, Garrison Engineers at the Presidency.....	18,875 8 2	83,786 8 1	22½

(Signed) H. J. MARGARY, Captain,
Acting Garrison Engineer at the Presidency.

The Account of the Expenditure in the Civil Architect's Department for the Year 1849.

Bombay, 1st May 1849.

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
GENERAL DEPARTMENT.						
Annual and Petty Repairs.						
Annual repairs to the buildings in the General Department for 1848-49	7,908	0	0			
Petty repairs to the buildings in the General Department..	2,981	0	1			
				10,889	0	1
Certain Works.						
Making repairs, &c., to the verandah of the Observatory at Colaba	836	3	0			
Erecting a new privy, and making some alterations to the old one, in the Secretariate compound	840	0	0			
Making certain alterations and repairs to the Office of the Deputy Secretary to Government in the Persian Department..	265	0	0			
Making certain alterations and additions to the Government House at Parell	453	0	0			
Cudjanning a portion of a wall on the monsoon side of the Government House at Parell	32	2	0			
Erecting a considerable portion of new railing, and making other improvements to the Government Grounds at Parell..	1,575	0	0			
Making certain additions to the new privies lately erected, and altering the two entrances to the Secretariate compound	262	0	0			
Making certain alterations to the Lunatic Asylum at Colaba....	1,975	0	0			
Making certain repairs to the road between the houses of the Hospital servants and the cook-rooms of the J. J. Hospital..	133	0	0			
Making certain repairs to the road and bridge of the Sally-port to the North of the Church Gate.	174	0	0			
Making several petty repairs to the buildings at Parell	474	0	0			
Making alterations and additions required to the buildings at Parell..	1,028	8	0			
Carried forward, Rs.....	8,047	13	0	10,889	0	1

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	8,047	13	0	10,889	0	1
Making the necessary repairs on the windows of the Grant Medical College, to prevent the rain from coming in	88	0	0			
Making certain works, and supplying articles for the use of the Government House at Parell	212	0	0			
Making alterations and repairs to the Government buildings at Malabar Point....	2,390	0	0			
Making certain improvements to the buildings of the Jamsetjee Jejeebhoy Hospital, and its compound	475	0	0			
				11,212	13	0
Buildings.						
Constructing a privy for the use of the Serjeant in Charge of the Malabar Point Flag-staff. ..	150	0	0			
Constructing a building, with fittings and cook-room, for the use of the students of the Grant Medical College	2,730	0	0			
Constructing quarters for the Assistant and Apprentices attached to the Jamsetjee Jejeebhoy Hospital.	2,515	0	0			
Erecting a new building required for the accommodation of the servants at the Government House at Malabar Point	770	0	0			
Making extra stabling and shed for the carriages at the Government House at Malabar Point....	1,052	0	0			
Constructing a temporary building at Parell for the use of the Governor's establishment.....	959	0	0			
				8,176	0	0
JUDICIAL DEPARTMENT.						
Annual and Petty Repairs.						
Annual repairs to the buildings in the Judicial Department for 1848-49.	1,100	0	0			
Petty repairs to the buildings in the Judicial Department	947	3	2			
				2,047	3	2
Certain Works.						
Repairing the shed which connects the Police Office at Mazagon to an adjoining out-house, used as a Chowkey	93	3	0			
Providing further accommodation in the female prisoners' ward in the House of Correction....	156	10	0			
Constructing a raised wooden step at the carriage entrance to the Supreme Court House..	12	0	0			
				261	13	0
Carried forward, Rs.....	.....			32,586	13	3

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	.....			32,586	13	3
Buildings.						
None.						
TERRITORIAL DEPARTMENT.						
Annual and Petty Repairs.						
Annual repairs to the buildings in the Territorial Department for 1848-49	2,874	0	0			
Petty repairs to the buildings in the Territorial Department	355	4	0			
				3,229	4	0
Certain Works.						
Making glass casements to the 27 windows of the Custom House, and a rubble masonry gutter for the cargo shed of that establishment.....	465	0	0			
Making repairs to the Soolamon Cadoo's Salt-pans....	694	4	11			
Erecting four stands for hanging scales in the Fort Custom House, and railing-in one weighing place..	90	6	0			
Constructing a wooden privy over the Sea, and converting a room into a privy for the use of the Custom House establishment....	310	0	0			
Constructing two ventilators to the melting room of the Mint	636	0	0			
Making alterations to the Musjed Bunder Custom House	395	0	0			
Making alterations and improvements to the Government Salt-pans and Chowkies....	510	0	0			
Raising the embankment of the Soolamon Shah Salt-pans..	3,118	0	0			
				6,218	10	11
Buildings.						
None.						
ECCLESIASTICAL DEPARTMENT.						
Annual and Petty Repairs.						
Annual repairs to the buildings in the Ecclesiastical Department for 1848-49	100	0	0			
Carried forward, Rs.....	100	0	0	42,034	12	2

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	100	0	0	42,034	12	2
Petty repairs to the buildings in the Ecclesiastical Department	308	3	0			
				408	3	0
Certain Works.						
Replacing 12 broken panes of glass in the windows of St. Andrew's Church..	2	4	0			
Making slight repairs to St. Andrew's Church...	93	15	0			
Making repairs to the Roman Catholic Chapel at Colaba..	28	3	0			
				124	6	0
Buildings.						
None.						
POLITICAL DEPARTMENT.						
Annual and Petty Repairs.						
Petty repairs to the buildings in the Political Department..	15	10	6			
				15	10	6
Certain Works.						
None.						
Buildings.						
None.						
MARINE DEPARTMENT.						
Annual and Petty Repairs.						
Annual repairs to the buildings in the Marine Department for 1848-49...	2,827	0	0			
Petty repairs to the buildings in the Marine Department..	771	12	6			
				3,598	12	6
Certain Works.						
Making repairs to the Mazagon Bunder..	111	10	0			
Removing the Admiral's Bungalow, with the compound and out-offices, on the Esplanade..	66	15	6			
Carried forward, Rs.....	178	9	6	46,181	12	2

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	178	9	6	46,181	12	2
Removing the Naval Captain's Bungalow, with the compound and out-offices, on the Esplanade....	56	1	9			
Making repairs to the Pilot's Bunder at Colaba..	440	8	0			
Remedying the dangerous state of the Apollo Pier	410	0	0			
Enlarging the head of the Mazagon Pier..	7,217	0	0			
				8,302	3	3
Buildings.						
None.						
Grand Total, Rupees Fifty-four Thousand Four Hundred and Eighty-three, Annas Fifteen, and Pies Five..				54,483	15	5

Statement of the Sums expended by the Civil Architect at the Presidency, from 1st May 1848 to 30th April 1849.

Names of Officers.	Annual and Petty Repairs.	Certain Works.	Buildings.	Total.
Captain J. H. G. Crawford, Captain H. J. Willoughby, and Capt. H. J. Margary, Civil Architects.	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*
General Department..	10,889 0 1	11,212 13 0	8,176 0 0	30,277 13 1
Judicial Department..	2,047 3 2	261 13 0	0 0 0	2,309 0 2
Territorial Department	3,229 4 0	6,218 10 11	0 0 0	9,447 14 11
Ecclesiastical Department	408 3 0	124 6 0	0 0 0	532 9 0
Political Department..	15 10 6	0 0 0	0 0 0	15 10 6
Marine Department..	3,598 12 6	8,302 3 3	0 0 0	11,900 15 9
Grand Total..	20,188 1 3	26,119 14 2	8,176 0 0	54,483 15 5

Statement showing the Cost of Engineering and General Superintendence of the Civil Architect's Department for the above Period.

Names of Officers.	Expense of Establishment per Annum.	Expenditure.	Rate per Cent.
	Rs. a. p.	*Rs. a. p.*	
Captain J. H. G. Crawford, Captain H. J. Willoughby, and Captain H. J. Margary, Civil Architects at the Presidency.	17,042 0 0	54,483 0 0	31¼

(Signed) H. J. MARGARY, Captain,
Acting Civil Architect at the Presidency.

No. 159 of 1849.

MARINE DEPARTMENT.

To

THE SECRETARY TO THE MILITARY BOARD,

Bombay.

SIR,

I have the honor to transmit the annexed Report of the Proceedings of this Department, for the official year ending 30th April 1849.

2. The Statement No. I. shows the actual expenditure on the various works in course of prosecution under me for the past official year, amounting to Rupees (64,203) sixty-four thousand two hundred and three.

3. The Statement No. II. shows the cost of Engineering, including every charge in detail, amounting to eighteen (18) per cent.

4. The only works worthy of any particular notice executed during the year, are as follows:—

1. The Basin.
2. The Breakwater.
3. The Cofferdam.
4. Fitting the Gate of the old Duncan Dock to the Bombay Dock.

1.—*The Basin.*

5. Scarcely anything has been done to this work. The contracts which were entered into for a portion of the supply of stone required, have been partially fulfilled. The contractors have, however, been requested not to quarry the quantity wanting to complete, until they receive further instructions on the subject, as the question of the large or small Basin appears to be still undetermined. The following is the quantity of stone received during the year :—

		No.	Cubic feet.
Cut stones	3′ × 2′ × 2′	459	5,438
Do. for Gate wheels ..	3½ × 2 × 1½	51	459
Do. Gate sill	3½ × 2½ × 1½	21	255½
Do. Caisson.....	4½ × 2 × 1½	19	256

2.—*The Breakwater.*

6. *Plan No.* 1.—On this Plan is entered the total portion of the sea wall of the Breakwater, completed to the 30th April 1849, and by deducting the work finished up to the 30th April 1848 from this quantity, the remainder will show the result of the last year's labour.

The total facing, with backing, to the 30th April 1849 is in square feet	10,667 0
And the portion to the 30th April 1848 is square feet	1,482 5
Square feet of sea wall facing, cut stone, with backing, completed in 1848-49	9,184 5 0

Which is equal to an extent of sea wall four hundred and fifty-nine (459) feet long, and twenty (20) feet high, constructed according to the Section Fig. III. Plan No. II.

7. The progress of this work has been slow, not for want either of materials or labour, both of which were at hand in abundance, but the lower courses being fixed only during the

low water spring-tides, with frequently the water on a level with the top of the lower or curb course, and the tides only receding sufficiently three days every month, during which the maximum time the work could be proceeded with averaged about two hours each day, it may easily be conceived how tedious was the operation of laying the first few courses of stone. During the monsoon the lower courses cannot be laid at all, as the South-West wind prevents the tide receding sufficiently; and even during the fair season, a strong Southerly wind has sometimes prevented the prosecution of the work from the same cause.

Plan No. 2.—In this Plan the three Sections of the sea wall of the new ground, and present Breakwater, are shown for the sake of comparison.

Fig I. is the Section of the old sea wall of the new ground.

Fig II. the original Section of the new sea wall of the Breakwater, and

Fig III. the Section of the sea wall as actually executed.

8. It will be observed that the only difference between the last two Sections is one foot in height: this one foot makes the greatest difference in the prosecution of the work. There are scarcely more than three tides throughout the year during which Fig II. could be executed.

9. In addition to the extent of sea wall completed, as mentioned in the concluding part of para. 6, the following quantities of stone have been collected:—

Squared stone	34,710	Cubic feet.
Rubble stone	10,41,332	ditto.
Khandkees for facing	8,057	Running feet.
Chunam ready for the mill..	3,492	Candies.

10. In my last year's Report I annexed a List of the contract prices of the stone.

3.—*The Cofferdam.*

11. The following is the quantity of materials prepared for this work :—

Wood Work.

Main piles	No.	94
Sheet piles	„	771
Do. do. small	„	760
Outer sheet piles	„	95
Wales, 279 in number	Running feet	6,273
Plank, 3 inch	No.	253
Do. 2 do	„	255

Iron Work for Piles.

Shoes, iron, large	„	93
Do. do. small	„	827
Do. do. do.	„	653
Iron bolts, round	„	368
Rings, iron, large and small	„	95

Winches.

Crab crane	„	6
Monkeys	„	4
Pile, wooden frames	„	6
Wheels, iron, with axles	„	6
Plumber blocks	„	12
Ketches, iron, wrought	„	12
Sheers, iron, with wooden blocks	„	5

12. The above comprise the whole of the articles that need for the present be prepared for the Cofferdam, which is three hundred feet long: the order for its commencement is anxiously awaited. Any further supply of articles that may be required can be easily furnished as the work proceeds, without in the least delaying its execution.

4.—*Fitting the old Gates of the outer Duncan Dock to the outer Bombay Dock.*

13. The outer Duncan Dock having been increased in width from 55 to 63½ feet, and fitted with new gates, so as to

admit the largest class of steamers in the Indian Navy, it was considered advisable to replace the outer gates of the Bombay Dock, which were in a very ruinous and precarious state, with those removed from the Duncan Dock.

14. On the completion of the Duncan Dock, these gates were floated out of the Dock, in which they had been deposited during the execution of the work, to the slope near the mast-shed, where they underwent a thorough repair; and before the Dam was commenced to the Bombay Dock, they were floated from the mast-shed slope into the Dock, and laid on the blocks, where the fitting to the hollow quoins of the heel-post and to the sill of the Dock took place.

Plan No. 3.—This Plan shows the staging it was necessary to erect on each side of the Dam, to make a platform for the pile engines to drive the main piles.

Plan No. 6 shows the staging in elevation, with cross ties, also the same in section.

Plan No. 4 is a plan of the Dam itself, with the staging on each side omitted. The Dam is fifty-eight feet in length, twenty-three and a half high, and six feet in width. There is a slight curve outwards of one foot in its length. It is composed entirely of main piles and planking; the former are connected together by four rows of single wale pieces on the inside, and three on the outside, the ends of these wales being well let into the masonry of the Dock walls. The framing is again strengthened by four-and-twenty bolts, from the outside of one wale to the outside of the other, in three rows of eight bolts each. The Dam is wholly supported from the inner side by fourteen horizontal struts, the ends of which are either let into the masonry or rest in the steps; the other ends abut on a straining beam, between each pair of struts, above each of the wale pieces. The object of this arrangement was to have the sills perfectly clear, to allow the gates to be properly fitted, and adjusted to their places.

Plan No. 5 shows a transverse section of the Dam itself,

exhibiting the inner struts which support the Dam, the straining beams and wale pieces in section, with the main piles and planking, the inner and outer puddle, with the penstock four feet from the bottom, to admit or let out the water as might be required. The mouth of the penstock and manner of closing is also shown on a larger scale. The clay forming the puddle was brought from the Harbour off Sewree and Rewus, and could not possibly have been of a superior description: with a head of nearly twenty feet of water during the spring-tides the Dam leaked very slightly.

15. The pile engines were principally made up in the Mint and Gun-carriage Manufactory. The monkeys were made from the old unserviceable rollers used in the former establishment for breaking and rolling the different metals, of five and ten hundred-weight each in weight. The crab winches which raised them were cast in the Gun-carriage Manufactory, and of excellent workmanship. As the piles could not be driven more than four feet before the rock was reached, very few blows of the monkey soon drove each pile into its place.

Plan No. 7.—In this Plan, the old method of securing the heel-posts of the Dock gates to the masonry is shown by a wooden cap, fitted over the top of the posts, secured to horizontal pieces of timber, which are again bolted firmly to upright posts set in masonry. These caps took up at least two feet of the Dock entrance, and were occasionally obliged to be removed when any very large vessel came into Dock. From the plan and section of these caps, the simple but somewhat clumsy method of securing the heel-posts will be easily seen.

Plan No. 8.—This Plan shows the substitution of iron anchors for the wooden caps above described; a written description will scarcely be necessary, as a glance at the Plan will immediately show the alteration effected.

16. This work was commenced the 15th September 1848, and completed the 26th April 1849. It appears a long time,

but if the gates had been used before the masonry in which the anchor-bolts were fixed had thoroughly set, a derangement of the heel-posts by the anchors yielding might have been anticipated. The mere execution of the work took a much shorter time.

17. The estimated amount sanctioned for this work was..... Rupees 6,687 0 0
And the total cost..... „ 4,813 0 0

Leaving a saving of..... „ 1,874 0 0

18. This includes every item of expense for the Dam, and the masonry. Repairing the old gates of the Duncan Dock, removing the old gate of the Bombay Dock, and replacing them in the former, as also the iron gate anchors, are not included, these portions of the work being performed by the Master Builder's Department.

19. I think, on the whole, this may be pronounced a cheap undertaking.

20. A list of the prices of materials and workmanship is annexed, in Statements III. and IV.

I have the honor to be, &c.

(Signed) P. L. HART, Captain,

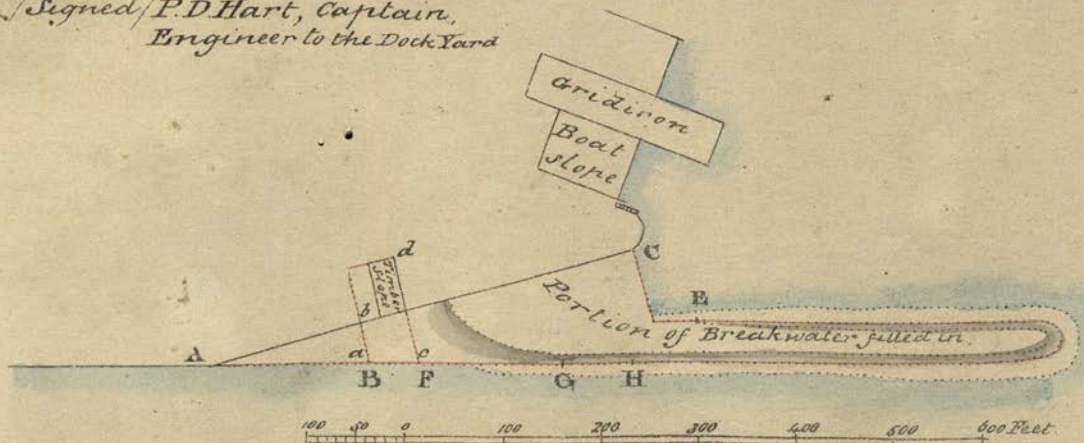
Engineer to the Dockyard.

Bombay,
Dockyard Engineer's Office,
7th July 1849.

Sketch of the Breakwater, shewing the portion completed to the 30th April 1849.

	A B		C D		D E		B F		F G		G H		a b		c d	
	Length	Height	Length	Height	Length	Height	Length	Height	Length	Height	Length	Height	Length	Height	Length	Height
Total portion completed to the 30th April 1849	168½	19	80	22	45	22	47	42	182	17	71	7	33	11	106	10

Signed/ P.D Hart, Captain,
Engineer to the Dock Yard

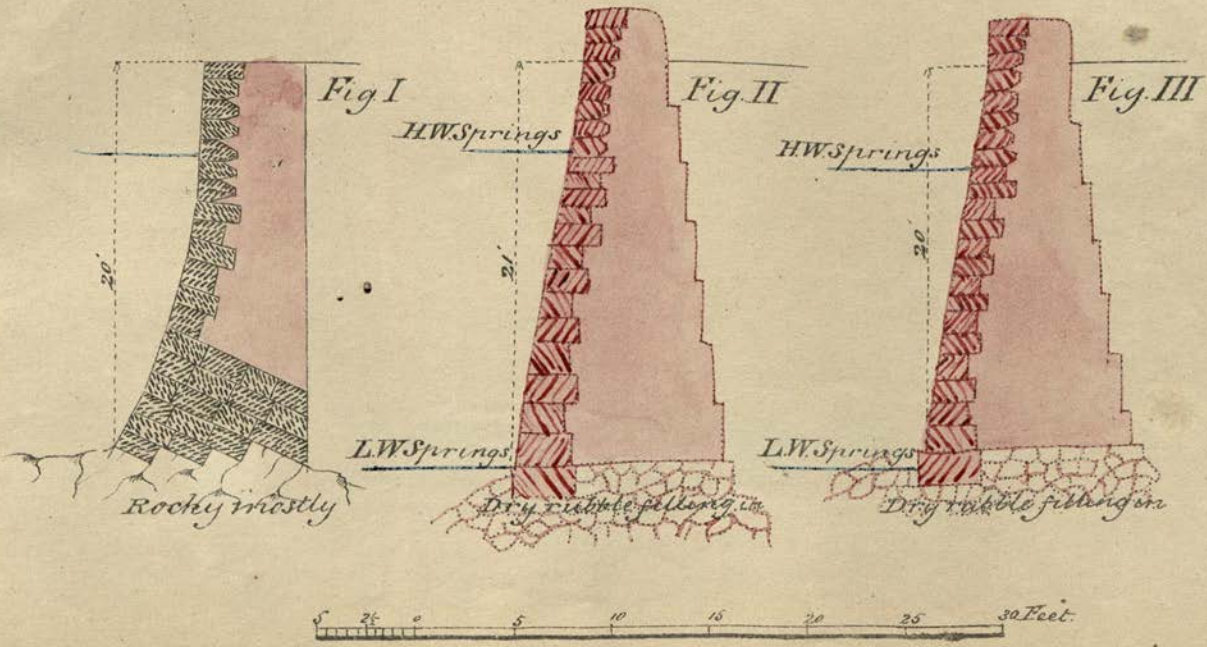


The red line shews the upper edge of the Retaining Wall when completed.
The shade of Indian Ink shews the portion filled in with dry rubble stone last year.

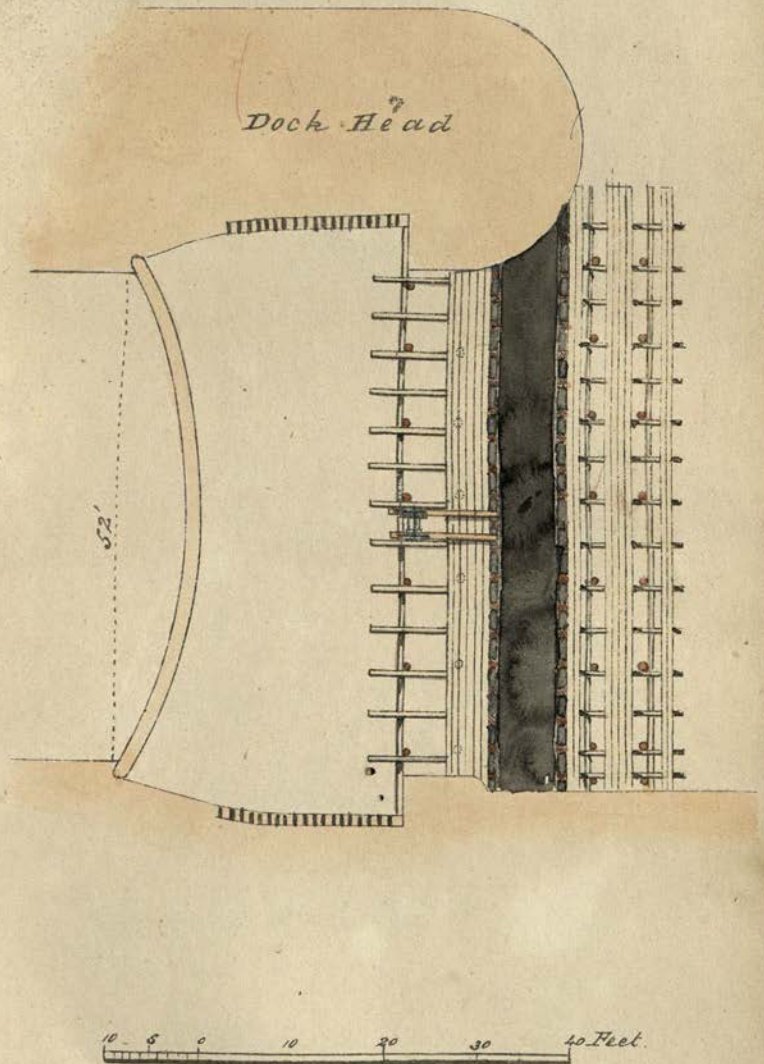
Section of Sea Wall to portion of the new Ground.

Original Section of new Sea Wall

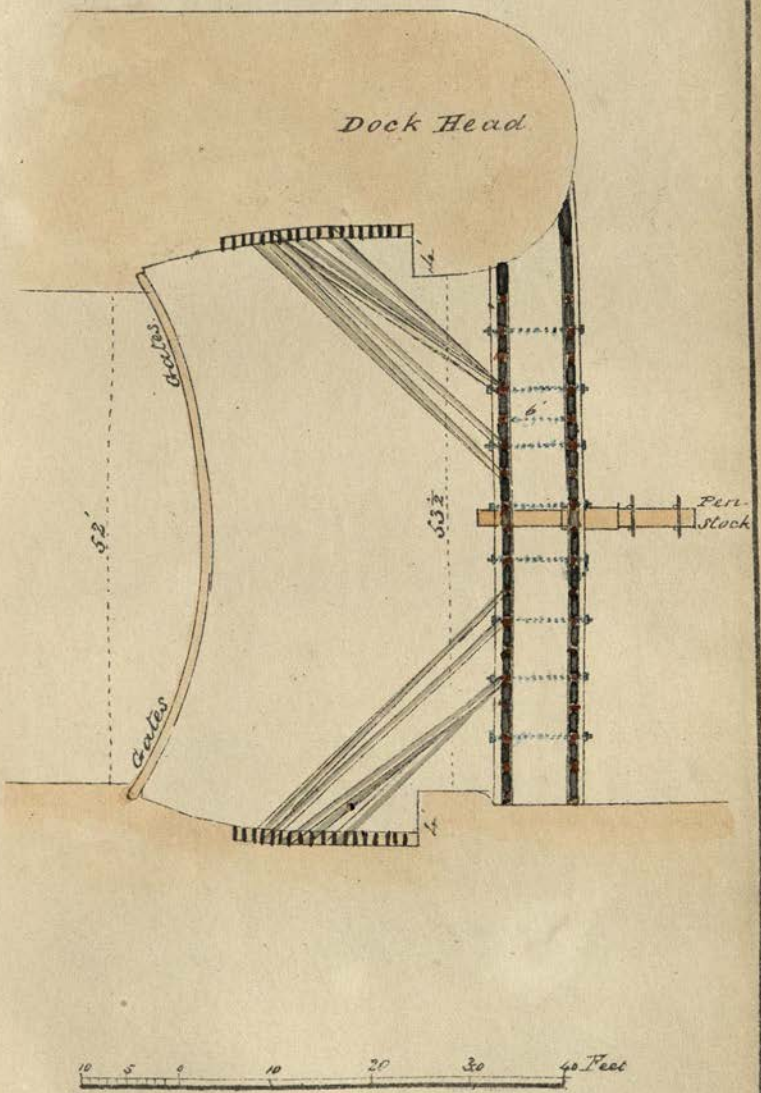
Section of Sea Wall as actually constructed



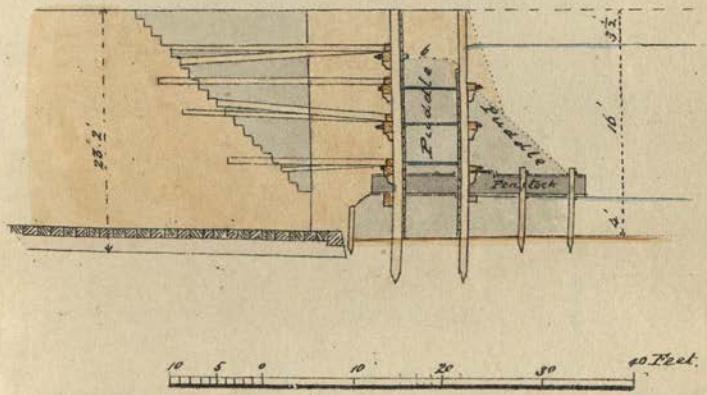
Plan of the staging on each side of the Dam for driving the Piles.



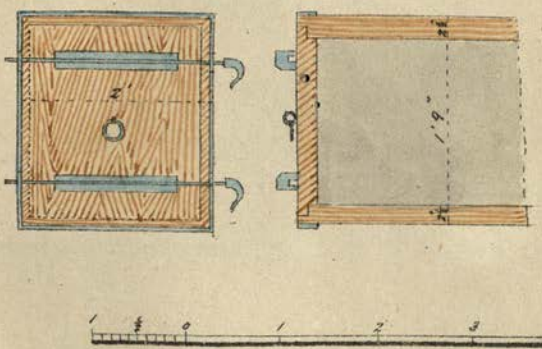
Plan of the Dam, without the stages, shewing the Penstock and method of strutting it up from the inside



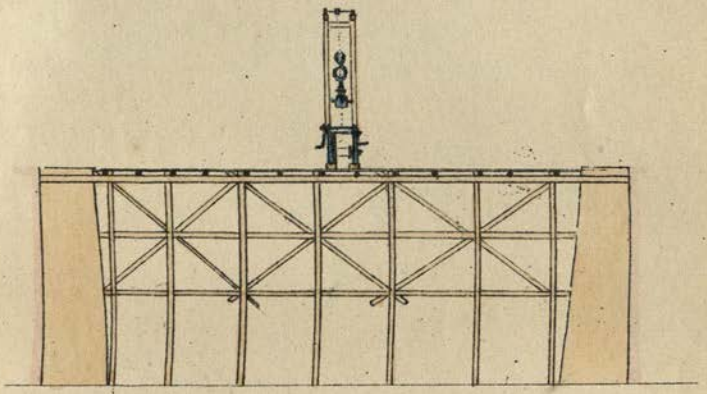
Transverse Section through the Dam.



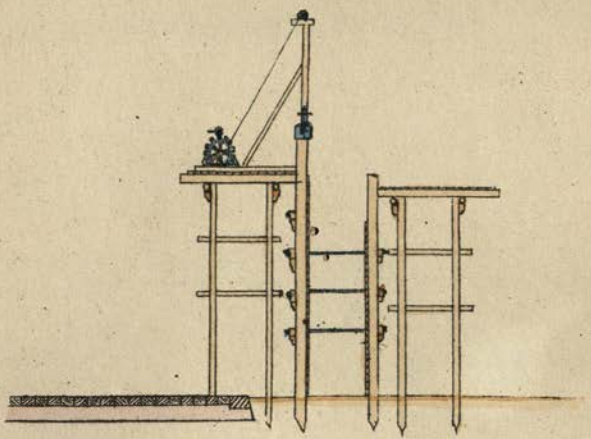
Mouth of Penstock to a larger scale.

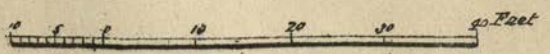


Elevation of Stage for driving the Piles.

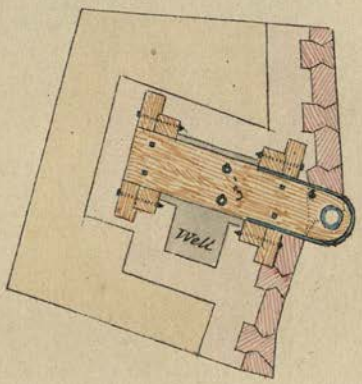


Section through the Stage for driving the Piles.

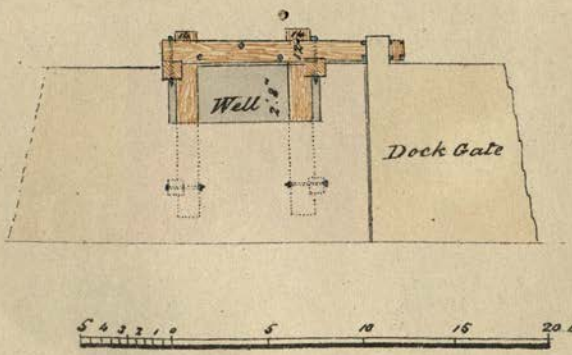




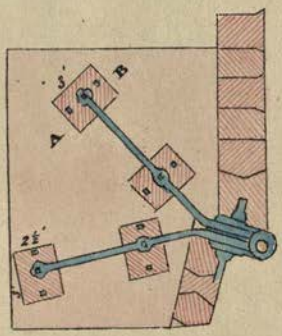
Plan of the Wooden Cap for securing the Heel Posts of the Dock Gates, / old method /



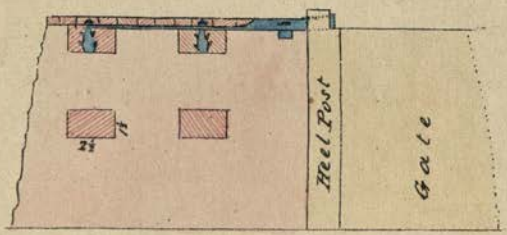
Section through the above.



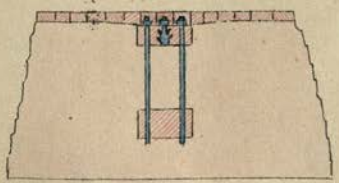
Plan of the Anchors substituted for the Wooden Caps for drawing the Heel Posts.

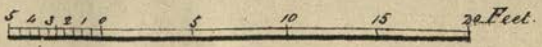


Section through the above.



Section on A B.





No. I.

Marine Department.

Statement showing the actual Expenditure upon Works carrying on under the Engineer to the Dockyard, for the Official Year from 1st May 1848 to the 30th April 1849.

Names of Works.	Amount.	Total.
	Rs. a. p.	*Rs. a. p.*
New Works.		
1. Constructing a Building-yard to the S. E. of the Dockyard and Saluting Battery, comprising three slips for building ships of war of the 1st Class of Her Majesty's Navy.	1,168 12 4	
2. Constructing a portion of the work connected with the proposed Basin and Breakwater, viz.		
Basin ..... Rs. 1,525 8 0		
Breakwater 29,702 1 3		
Cofferdam 16,611 1 1		
	47,898 10 4	
3. Rendering the buildings in the Dockyard more secure against the risk of fire.....	736 15 10	
4. Erecting the various portions of the timber for the Horse Artillery Barracks at Kurrachee.	542 7 5	
5. Enclosing with railing the Battery premises between the Colaba Causeway and Apollo Pier..	140 0 0	
6. Erecting a work-shed and store-room for the Engineer to the Dockyard..	2,236 0 0	
		52,722 13 11
Repairs to Fortifications and Buildings.		
7. Annual repairs to the buildings in the Dock and Building-yards for 1848	2,080 0 0	
8. Replacing the cadjan on the shed erected over H. M.'s ship "Meeanee"	820 0 0	
9. Erecting a shed over the schooner now building for the Crown	175 0 0	
10. Making certain alterations to the Indian Naval Storekeeper's premises	426 7 5	
11. Fitting the old gates of the Duncan Dock to the Bombay Dock	4,813 4 7	
		8,314 12 0
Carried forward, Rs.....	.....	1,037 9 11

	Names of Works.	Amount.			Total.		
		Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
	Brought forward, Rs.....	.....			61,037	9	11
	Emergent Works.						
12.	Building two wooden posts on the Duncan Dock, on the new ground, with rough masonry	10	12	1			
13.	Repairing a breach in the face of the old Saluting Battery wall	77	7	10			
14.	Repairing the parapet wall of the bridge and road from the arch to the new ground.	268	12	0			
15.	Replacing wooden frame and sluice-post of the slips on which the "Meeanee" was built..	3	8	2			
16.	Enlarging the accommodation of the Dockyard Guard....	23	1	6			
17.	Adjusting the cadjan roofing of the Police hulk "Zenobia."	73	7	0			
18.	Repairing the railing round the engine house boiler trough..	55	11	5			
19.	Repairing a portion of the wall of I. N. Storekeeper's yard	28	5	1			
20.	Making the necessary repairs to the water-courses in the Storekeeper's yard and the Conductors' room at the Depôt	23	5	4			
21.	Replacing the few broken windows of an apartment of the Officers of the Indian Navy, and also repairing the whitewashing in passage and kitchen of the same building	47	7	7			
22.	Erecting a cadjan shed over the schooner lately built on the new ground	71	12	8			
23.	Cutting a doorway and fitting a door in the warping Lascars' Bank Shall	8	5	2			
24.	Repairing the slip outside the wall of H. M.'s gun ship "Meeanee."..	14	7	5			
25.	Removing the cadjan from the side of the mould loft	2	11	0			
26.	Repairing and whitewashing the wall of the mould loft	63	12	8			
27.	Removing the sea wall of the slip No. 1, for the purpose of launching H. M.'s gun ship "Meeanee."...	142	5	10			
28.	Removing the shed from the "Meeanee" as soon as possible	290	12	10			
29.	Repairing the road between the outer and inner gates of the new ground	33	9	1			
30.	Repairing the masonry work of the Dockyard steam kiln	12	9	7			
31.	Constructing masonry work for the new ground steam kiln	37	15	5			
	Carried forward, Rs....	1,290	3	8	61,037	9	11

	Names of Works.	Amount.			Total.		
		Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
	Brought forward, Rs.....	1,290	3	8	61,037	9	11
32.	Conveying the stores from the Dockyard to the Engineers' yard on the new ground	17	13	6			
33.	Fitting the grooves of the caisson to the iron brace of the caisson	0	15	5			
34.	Making a small opening or aperture in the lower part of the chimney of the Dockyard Engine-room..	2	7	10			
35.	Effecting the several repairs to premises in the Dockyard...	91	9	10			
36.	Repairing the gates of the Dockyard	54	7	10			
37.	Completing the slope on the new ground by the 15th January, for the launch of the "Colonial Scheme."	275	15	4			
38.	Fixing forty bolts on the slip on which the schooner for the Colonial Government is under construction	15	3	11			
39.	Effecting the necessary repairs to the pilot and warp boats Lascars' Bank Shall ..	64	1	0			
40.	Reconstructing that part of the sea wall of new ground, at the end of the slip lately occupied by H. M.'s ship "Meeanee" ..	529	13	8			
41.	Refixing the boiler for the Dockyard engine.	424	7	2			
42.	Making and fitting wooden rollers to the stone slope on one side of the gridiron, for the purpose of more readily hauling up and launching the Governor's bunder boat	59	3	1			
43.	Removing the railing between the rampart and Superintendent's Office, and enclosing the Office veranda of the Master Attendant's lower Office with railing..	67	10	6			
44.	Repairing the hinges of the main gates of Dockyard, and gates on the new ground, and also replacing some stones that have been washed out of the sea wall near the Warden's quarters	27	2	2			
45.	Erecting a shed over the small engine at the end of the smithy	157	14	8			
46.	Removing the stones obstructing the thoroughfare and communication of the Dockyard	86	6	9			
					3,165	8	4
	Rupees.....				64,203	2	3

(Signed) P. L. HART, Captain,
Engineer to the Dockyard.

Bombay,
Dockyard Engineer's Office,
7th July 1849.

No. II.

Marine Department.

Statement showing the Cost of Engineering in the Marine Department, under the Engineer to the Dockyard, from 1st May 1848 to 30th April 1849.

	Amount of Establishment.	Total amount of Establishment.	Expenditure.	Rate per cent.
	Rs. a. p.	*Rs. a. p.*	*Rs. a. p.*	
Captain P. L. Hart's Pay for Marine and Steam Departments, for the month of May 1848	600 0 0			
Ditto do. June	600 0 0			
Ditto do. July	600 0 0			
Ditto do. August	600 0 0			
Ditto do. September	600 0 0			
Ditto do. October	600 0 0			
Ditto do. November	600 0 0			
Ditto do. December	600 0 0			
Ditto do. January	600 0 0			
Ditto do. February	600 0 0			
Ditto do. March	600 0 0			
Ditto do. April	600 0 0			
		7,200 0 0		
Carried forward, Rs....	.....	7,200 0 0		

			Brought forward, Rs.....			.....			7,200	0	0	
Establishment for the month of			May.....	....	....	....	353	0	0			
Ditto	do.		June.....	....	....	....	351	0	0			
Ditto	do.		July.....	....	....	....	300	11	10			
Ditto	do.		August....	....	....	....	433	0	0			
Ditto	do.		September..	....	....	....	465	14	5			
Ditto	do.		October ..	....	....	....	493	0	0			
Ditto	do.		November..	....	....	....	493	0	0			
Ditto	do.		December .	....	....	....	438	11	11			
Ditto	do.		January ..	....	....	....	382	4	9			
Ditto	do.		February ..	....	....	....	392	4	9			
Ditto	do.		March	....	....	....	392	4	9			
Ditto	do.		April	....	....	....	392	4	9			
										4,887	9	2	64,203	2	3	18¾
						Total, Rs.....				12,087	9	2				

(Signed) P. L. HART, Captain,
Engineer to the Dock-yard.

Bombay,
Dockyard Engineer's Office,
7th July 1849.

No. III.

Marine Department.

List of Prices of Work-people employed on fixing the old Gates of the Duncan Dock to the Bombay Dock.

	Rates.			Per
	Rs.	*a.*	*p.*	
English Writer	0	6	2	Day.
Subness	0	7	4	do.
Carpenters	0	12	4	do.
Ditto	0	10	8	do.
Ditto	0	9	8	do.
Ditto	0	8	0	do.
Ditto	0	7	10	do.
Ditto	0	7	2	do.
Ditto	0	5	4	do.
Ditto	0	4	3	do.
Ditto	0	3	2	do.
Ditto	0	2	7	do.
Stonecutter Maistry..	0	13	6	do.
Ditto.	0	12	4	do.
Stonecutters..	0	7	10	do.
Ditto	0	7	2	do.
Ditto	0	6	5	do.
Bricklayers..	0	7	10	do.
Ditto	0	7	2	do.
Mahratta Writer	0	3	1	do.
Caulkers....	0	9	10	do.
Ditto	0	7	4	do.
Ditto	1	0	0	do.
Drillers	0	9	10	do.
Ditto	0	7	4	do.
Nowghanees..	0	4	6	do.
Ditto	0	4	0	do.
Iron Smith..	0	7	10	do.
Hammerman..	0	4	0	do.
Waterman	0	3	4	do.
Muckadum..	0	4	11	do.
Ditto	0	4	0	do.
Sarang	0	6	2	do.
Lascars	0	4	7	do.
Ditto	0	3	9	do.
Beldars	0	7	2	do.
Chowkeydar..	0	3	2	do.
Ditto	0	3	9	do.
Peon	0	3	9	do.

	Rates.			Per
	Rs.	*a.*	*p.*	
Labourers	0	2	8	Day.
Ditto, boys..	0	2	1	do.
Carts	1	0	0	14 Trips.
Sawyers' work	0	2	8	Hund. Sqr. feet.
Removing piles from the Dam.	0	7	0	do.

(Signed) P. L. HART, Captain,
Engineer to the Dockyard.

Bombay,
Dockyard Engineer's Office,
7th July 1849.

No. IV.

Marine Department.

List of Prices of Materials used in fixing the old Gates of the Duncan Dock to the Bombay Dock.

	Rates.			Per
	Rs.	*a.*	*p.*	
Main piles, 19 in No. Length 28′ × 1 Diam..	19	11	9	Each.
Sheet do. 12 in No. do. 19′ × 9″	4	8	0	do.
Do. do. 5 in No. do. 19′ × 9″	2	10	4	do.
Wales Sotta, 8 in No. do. 277′ × 1″	4	14	0	do. piece.
Do. do. 6 in No. do. 209′ × 9″	4	6	0	Ditto.
Struts, 4 in No. do. 33′ × 1″	8	7	0	Each.
Do. 3 in No. do. 25′ × 1″	4	13	4	do.
Sotta, Jungle ..... do. 25 × 9″	4	8	0	do.
Rafters, do	8	0	0	Corge, 20 in No.
Iron bolts, 16 in No. do. 6′-2″ × 2″	3	7	0	Maund, or 28 lbs.
Large spikes ..... do. 1′-9″ × ⅞ Diam..	0	6	6	Each.
Straps, iron, 2 in No	3	0	0	Maund, or 28 lbs.
Iron screw-bolts, each long 2′ × ⅞ Diam. with screw, nuts, and washer complete	0	9	0	Each.
Mud or clay for puddle..	2	4	0	Brass, 116 cubic feet.
Do. do	2	3	0	Ditto.
Steel, square	4	0	0	Maund, or 28 lbs.
Do..	3	8	0	Ditto.
Nails, two-pointed..	2	8	0	Ditto.
Nails, Country, 5 to 15 inch..	2	12	0	Ditto.
Do. 10 to 15 do..	2	8	0	Ditto.
Do.	2	0	0	Ditto.
Nails, Europe, 2 inches..	4	8	0	Ditto.
Spike nails	3	0	0	Ditto.
Nails, Europe, 1½ inch	5	0	0	Ditto.
File, three sides..	0	3	6	Each.
Chalk..	0	0	4	Seer.
Grease	0	4	0	Pound.
Stones, 3¼ × 2¼ × 1½, seven in No.	0	7	0	Cubic foot.
Do. 3 × 2 × 1½, one in No..	0	7	0	Ditto.
Do. 2½ × 2 × 1½, nine in No..	0	7	0	Ditto.
Oakum	2	0	0	Maund, or 28 lbs.
Wax, caulking	2	8	0	Ditto.
Cotton, spun	0	1	8	Seer.
Rope, coir	1	6	0	Maund, or 28 lbs.
Coirs	1	0	0	Ditto.
Gingely Oil	2	4	0	Ditto.
Cocoanut do..	0	1	0	Seer.
Pitch	0	14	0	Maund, or 28 lbs.
Do.	0	13	0	Ditto.

	Rates.			Per
	Rs.	*a.*	*p.*	
Lead	3	1	0	Maund, or 28 lbs.
Do.	3	13	0	Ditto.
Blackwood, for splitting up, for lighting up at night	10	0	0	Corge, or 20 pieces.
Cloth, Dungary	0	2	0	Yard.
Do. do.	0	12	0	Piece.
Tacks..	0	4	0	Pound.
Baskets, bamboo, small	3	0	0	Hundred.
Charcoal (Junglewood)	1	0	0	5 Pharas.
Chunam mixed with sand, and double ground	3	12	0	Candy.
Rubble stones..	3	12	0	Brass, or 166 Cubic feet.
Chunam, Neroo, for setting squared stones ..	3	8	0	Candy.
Clay of puddle, removing	1	8	0	Brass, or 116 Cubic feet.
Iron castings, for strengthening the sides of Gates, 2 in No..	38	9	7	

(Signed) P. L. HART, Captain,
Engineer to the Dockyard.

Bombay,
Dockyard Engineer's Office,
7th July 1849.

No. 2811 of 1849.

GENERAL DEPARTMENT.

To

THE SECRETARY TO THE MILITARY BOARD,

Bombay.

SIR,

I have the honor to forward the Annual General Report of the Proceedings of the Department of Public Works in the Southern Provinces during the official year 1848-49.

2. The total expenditure from the 1st May 1848 to the 30th April 1849, in the Military and Civil Departments, is as follows:—

Total Expenditure, in the Military and Civil Departments of the several Executive Officers of the Public Work Department in the Southern Provinces.

Names of Divisions.	Amount expended on each.	Amount of Superintendence.	Superintendence percentage.
POONAH.	*Rs. a. p.*	*Rs. a. p.*	
MILITARY DEPARTMENT.			
Repairs	11,109 14 1		
Annual repairs..	7,993 10 0		
New works..	71,013 7 1		
Military Department, Total..	90,116 15 2		

Names of Divisions.	Amount expended on each.			Amount of Superintendence.			Superintendence percentage.
CIVIL DEPARTMENT.	*Rs.*	*a.*	*p.*	*Rs.*	*a.*	*p.*	
Repairs	1,663	11	3				
Annual repairs	7,312	12	6				
New works..	5,536	14	11				
Civil Department, Total..	14,513	6	8				
Military Department, Total..	90,116	15	2				
Grand Total..	1,04,630	5	10	16,425	11	9	15 11/16
AHMEDNUGGUR.							
MILITARY DEPARTMENT.							
Repairs	2,229	10	4				
Annual repairs	6,348	12	2				
New works..	368	1	6				
Military Department, Total..	8,946	8	0				
CIVIL DEPARTMENT.							
Repairs	3,381	4	3				
Annual repairs	1,562	7	0				
New works..	6,487	5	0				
Civil Department, Total..	11,431	0	3				
Military Department, Total..	8,946	8	0				
Grand Total....	20,377	8	3	6,858	3	7	33 10/16
BELGAUM.							
MILITARY DEPARTMENT.							
Repairs	1,128	11	5				
Annual repairs	4,798	6	11				
New works..	4,641	8	11				
Military Department, Total..	10,568	11	3				
CIVIL DEPARTMENT.							
Repairs	7,135	15	2				
Annual repairs	24,514	13	7				
Special repairs	69	10	1				
New works..	3,926	4	7				
Civil Department, Total..	35,646	11	5				
Military Department, Total..	10,568	11	3				
Grand Total....	46,215	6	8	16,332	2	1	35 5/8

Names of Divisions.	Amount expended on each.	Amount of Superintendence.	Superintendence per-centage.
DHARWAR.	*Rs. a. p.*	*Rs. a. p.*	
MILITARY DEPARTMENT.			
Repairs	565 8 2		
Annual repairs	74 7 11		
New works..	0 0 0		
Military Department, Total..	640 0 1		
CIVIL DEPARTMENT.			
Repairs	2,234 13 10		
Annual repairs	2,103 10 0		
New works..	11,987 8 3		
Civil Department, Total..	16,326 0 1		
Military Department, Total..	640 0 1		
Grand Total..	16,966 0 2	10,810 14 5	$63\frac{11}{16}$
KOLAPOOR.			
MILITARY DEPARTMENT.			
Repairs	744 12 6		
Annual repairs	1,953 4 7		
New works..	5,389 11 7		
Military Department, Total..	8,087 12 8		
CIVIL DEPARTMENT.			
Repairs	0 0 0		
Annual repairs	111 11 9		
New works..	0 0 0		
Civil Department, Total..	111 11 9		
Military Department, Total..	8,087 12 8		
Grand Total....	8,199 8 5	2,312 2 5	$28\frac{3}{16}$
SHOLAPOOR.			
MILITARY DEPARTMENT.			
Repairs	0 0 0		
Annual repairs	1,905 11 7		
Special repairs	157 15 9		
New works..	0 0 0		
Military Department, Total..	2,063 11 4		

Names of Divisions.	Amount expended on Each.	Amount of Superintendence.	Superintendence per-centage.
CIVIL DEPARTMENT.	*Rs. a. p.*	*Rs. a. p.*	
Repairs	0 0 0		
Annual repairs	40 5 7		
Special repairs	103 0 1		
New works..	0 0 0		
Civil Department, Total..	143 5 8		
Military Department, Total..	2,063 11 4		
Grand Total....	2,207 1 0	880 0 0	39¼
KANDEISH.			
MILITARY DEPARTMENT.			
Repairs	400 5 3		
Annual repairs	609 4 7		
New works..	688 2 8		
Military Department, Total..	1,697 12 6		
CIVIL DEPARTMENT.			
Repairs	9,556 15 8		
Annual repairs	21,053 14 2		
Special repairs	56 9 8		
New works..	51,627 0 8		
Civil Department, Total..	82,294 8 2		
Military Department, Total..	1,697 12 6		
Grand Total....	83,992 4 8	28,599 2 11	34
ASSEERGHUR.			
MILITARY DEPARTMENT.			
Repairs	390 6 0		
Annual repairs	185 0 0		
New works..	115 7 11		
Military Department, Total..	690 13 11		
CIVIL DEPARTMENT.			
None	0 0 0		
Military Department, Total..	690 13 11		
Grand Total.... ...	690 13 11	0 0 0	0

Names of Divisions.	Amount expended on each.	Amount of Superintendence.	Superintendence per centage.
DAPOOLEE.			
MILITARY DEPARTMENT.	*Rs. a. p.*	*Rs. a. p.*	
Repairs	253 3 2		
Annual repairs	400 0 0		
New works..	52 15 0		
Military Department, Total..	706 2 2		
CIVIL DEPARTMENT.			
None	0 0 0		
Military Department, Total..	706 2 2		
Grand Total....	706 2 2	140 0 0	19$\frac{3}{4}$
Grand Total amount of Expenditure	2,83,985 3 1		

3. I beg also to forward Lieutenant Bell's annual Report of the proceedings of the Civil Engineer's Department in Candeish, for the official year 1848-49.

4. The separate Report called for, regarding Military Buildings, Roads, Cantonments, &c., will be forwarded as soon as it is prepared.

I have the honor to be, &c.,

(Signed) C. W. GRANT, Lieut. Colonel,
Superintending Engineer, S. P.

Superintending Engineer's Office, S. P.,
Poonah, 27th November 1849.

Extracts from a Letter from the Civil Engineer, Candeish, to the Acting Superintending Engineer, S. P., No. 637, of the 15th October 1849.

TERRITORIAL DEPARTMENT.

5. *Cunnassee Bundarrah.*—This work was stated in the Annual Report for the official year 1847-48 to be completed, with the exception of some trifling additions required to the aqueduct, which had been decided on by the Assistant Collector and myself, in March 1848, as likely to be useful. These additions, consisting of scouring sluices above and below the aqueduct, were executed in May 1848, at a cost of Rupees four hundred and sixty-eight, Annas twelve, and Pies eleven (468-12-11); but on the 22nd of July the parapets of the aqueduct were carried away by a flood, and repaired on emergency, at a cost of Rupees four hundred and seven, Annas seven, and Pies nine (407-7-9), in which was included the cost of a cross wall near the mouth of the water-course; but the fundamental defect noticed in the last Annual Report, viz. the steep slopes to the sides of the cutting of the water-course, deep in bad soil, not having been remedied (such a work being impossible of execution at the season), it is not surprising that on the 4th of October, nearly the last flood of the season again carried away the parapet walls so lately repaired. Nothing remaining to be done after this last accident but effectually to remedy the fundamental defect in the water-course, I was permitted to proceed with the work in April last, adopting such measures as I might think necessary for the effectual security of the entire line of water-course. By the end of the official year considerable progress had been made in the required cutting down of the high banks of the water-course, as well as in the effectual repair of the aqueduct, the main arch of which had been found to be so broken and injured by the last accident, as to necessitate its entire removal, by which

opportunity was afforded for a new construction of superstructure, giving an increase of water-way of one (1) foot in width. The entire modifications and improvements are to be duly explained by plans, &c.

6. *Improvements to the Chowndana Bundarrah.*—This work is noticed in the last Annual Report as nearly completed. The finishing stroke was given to it very shortly after the commencement of the official year 1848-49, by fitting with teak planks the three (3) sluices in the Bundarrah. The work appears to have been followed by very satisfactory results. A large body of water now occupies the place of a mass of sand and deposit previously choking up the rear of the Bundarrah wall, and the supply of water has enabled the villagers to bring under wet cultivation land previously yielding monsoon crops only. The total cost of the work has been Rupees fifteen hundred and three, Annas nine, and Pies nine (1,503-9-9).

7. *Improvements to the Kundanah Bundarrah.*—This work, which is on the same river, about two miles above the Chowndanah Bundarrah, was also noticed in the last Annual Report as "nearly completed." The repairs were completed very shortly after the commencement of the official year, at a total cost of Rupees eleven hundred and thirty-nine, and one Pie (1,139-0-1), but without the satisfactory result attending the repairs of the lower Bundarrah at Chowndanah, as it appears that no water occupies the place of the previously accumulated deposit, or at least but in quantities too trifling to be of any service. This proves the existence of good springs in the bed of the river between the Kundanah and Chowndanah Bundarrahs, as otherwise the former, being the upper Bundarrah, would have been better supplied than the lower. It is to be regretted that this outlay should have been thus lost to Government, but it would have been difficult, if not impossible, to have anticipated such a failure.

8. *Constructing the Seerusmunee Bundarrah.*—At the close of the official year 1847-48 the foundations of this work, as modified by me from Captain Hart's original design, were in

progress. Between the commencement of the past official year and the setting in of the monsoon of 1848 they were completed, with the exception of a corner of no consequence, and were thus left with confidence to the effects of the monsoon floods of last year. The modified design for the superstructure having received the approval and sanction of Government during the season of the suspension of all district works, the work was resumed at the opening of the working season, according to the revised design, and by the end of the past official year had been completed with the exception of some trifling details, which, however, bring its completion into the official year 1849-50, to be noticed in the next Annual Report, with a statement of the effects of the present monsoon (a very heavy one) on the new work of the first Bundarrah ever constructed by the Engineer Department new "in toto."

9. *Completing the Zeykeira Bundarrah.*—I had expected to have been able to have reported the completion of this extensive work during the past official year, but though complete in respect to all the more difficult works of tunnels, &c., there remained at the close of the past official year sufficient work to render it doubtful whether it might not be stopped by the monsoon before all could be completed. The repairs and improvements to render the magnificent Bundarrah efficient, were completed before the monsoon of 1848, as well as the first tunnel on the line; and on resuming the operations at the commencement of the year 1849 it was gratifying to find that the work done the previous year had not suffered in the least from the effects of the monsoon. The next Annual Report will, I have no doubt, contain satisfactory notice of the completion of this work.

10. *Improvements to the Dhabaree Patna Bundarrah*, noticed in the last Annual Report as nearly completed, was completed, and the four (4) sluices fitted with teak planks, very shortly after the commencement of the past official year, at a cost of Rupees three thousand seven hundred and twelve, Annas nine, and Pies eleven (3,712-9-11). The monsoon of 1848

did not in any way injure the new work, but the shifting of the deposit in rear of this Bundarrah, consequent on the construction of the four (4) sluices on the left bank, and the prolongation of the wall on the right bank, has not given satisfaction to the villagers of the two (2) villages Dhabaree and Patna, on the opposite banks of the river, who are constantly quarrelling about the supply of water. In a river having low banks, like the Girna River, at the point where this Bundarrah is constructed, it does not appear to me possible to modify an old existing Bundarrah so as to supply water in the required proportions to land on both sides of the river. All that can be done is to render the Bundarrah and water-courses so efficient that there may be as little loss as possible of the water supplied by the river, leaving it to the villagers, under the superintendence of the proper revenue authorities, to divide the water proportionably to their requirements on either side of the river.

11. *Improvements to the Mandul Bundarrah, improvements to the Jappee Bundarrah, and improvements to the Jambolee Bundarrah.*—The repairs to these three (3) Bundarrahs and their water-courses were noticed in the last Annual Report as nearly completed. They were all completed very shortly after the beginning of the past official year, at the costs of Rupees seventeen hundred and thirty-two, Annas three, and Pies four (1,732-3-4), Rupees seventeen hundred and thirty-nine, Anna one, and Pies ten (1,739-1-10), and Rupees five hundred and eighty-nine, Annas fifteen, and Pies five (589-15-5), respectively. I have not myself had an opportunity of visiting the localities of these works, which have been carried on and completed under the superintendence of my Assistant, Lieutenant Jones, who reported their satisfactory completion. To the best of my belief they have answered their purpose effectually.

12. *Improvements to the Moodee Bundarrah* were nearly completed at the close of the official year 1847-48, and were satisfactorily completed shortly after the commencement of

the past official year, under the superintendence of Lieutenant Jones, at a total cost of Rupees two thousand nine hundred and three, Annas five, and Pies nine (2,903-5-9), being Rupees two hundred and seventy-five, Annas five, and Pies nine (275 5-9) in excess of the sanctioned estimate, which has been duly explained, and the modifications made by Lieutenant Jones sanctioned.

24. *Constructing two Sluices in the lower Bundarrah of the Village of Arrai.*—This was not an emergent work, though sanctioned on a rough estimate sent by me to the Collector. The Arrai Bundarrah is lower down the same river as the Kundanah and Chowndanah Bundarrahs, and its rear was, like theirs, choked with sand. It is hoped that by means of the two sluices, which have been completed at a cost of Rupees one hundred and fifty-four, Annas thirteen, and Pies four (154-13-4), the deposit may be carried off to a great extent by the present monsoon of 1849, but the case of the Kundanah Bundarrah shows that, unless there are springs to supply the Bundarrah, very little will be gained by the removal of the deposit.

25. *Repairs to the Bundarrah and Water-course of the Town of Shada.*—The repairs to this Bundarrah and water-course consisted of stopping a considerable leak in the rear of the Bundarrah wall, by backing the wall with new masonry, near the leaky point, and constructing four (4) breast walls on the line of the water-course. The work at Shada is at a great distance from Malligaum, and when I visited it during the progress of the work, some additions and modifications were considered by me absolutely necessary, such as building up an extensive gap on the down-stream side of the Bundarrah wall, and constructing a waste weir and scouring sluice at the mouth of the water-course, which I accordingly ordered to be done, causing an excess of no great amount above the estimated cost. The work has since been completed satisfactorily, at a cost of Rupees six hundred and eighty-three, Annas three, and Pies five (683-3-5).

26. *Repairs to the Bundarrah and Water-course of the Town of Muchmull.*—The old Bundarrah, being unserviceable, was to be rejected, and a new Bundarrah built; a short distance below it, considerable new cuttings for water-course, on the line of which were also to be constructed two (2) aqueducts, and four (4) breast walls. On visiting the work, which is in a most unhealthy district in Western Candeish, I found it necessary to make some modifications in the sanctioned design of the work of the Bundarrah, which I found totally unprovided with a protecting screen-wall to the mouth of its water-course, a defect not to be tolerated in a new work undertaken by the Department. A waste weir and scouring sluice were also added by me for obvious reasons. Having had no time to spare, I was not able to examine the entire line of water-course, but left this for Lieutenant Jones to do. Before the end of the official year the modified Bundarrah had been nearly completed, with a portion of the new water-course. Serious difficulties have been met with in the course of this work, from the unhealthiness of the locality causing the disablement or desertion of the work-people. Lieutenant Jones was himself disabled by sickness in this part of the country.

28. *Constructing a Breast Wall across the Sakree Nullah, &c. &c. &c., at Khutghur.*—The Sakree Nullah destroyed, at every flood, the villagers' kutcha dam for the water-course, which has now been replaced by a pukka breast wall, with a screen-wall to the water-course, on the side where the force of the nullah is greatest. The work was very nearly completed at the close of the official year, as had been the repairs of an old aqueduct a short distance below the new breast wall.

29. *Repairs and improvements to the centre Bundarrah and Water-course of Seerwarra.*—These consisted of breaking two (2) scouring sluices in the main Bundarrah wall, which is in excellent order, though quite choked with deposit in its rear; building a screen-wall, with an arched opening, at the mouth of the water-course; and breaking a small open-headed scouring sluice below this screen-wall. The parapets of an old

aqueduct on the line of water-course, a short distance from the Bundarrah, had to be renewed. This work was sanctioned on a rough estimate furnished by me to the Collector, and was nearly completed at the close of the official year.

30. *Repairing the Bundarrah and Water-course of Akheira.* —The usual defects to be remedied and repairs executed; raising the general level of the crest of the Bundarrah; breaking two (2) scouring sluices to remove the accumulated deposit in rear; and the construction of breast walls in weak or injured portions of the water-course, where entered or crossed by a nullah. Considerable progress had been made in these works before the close of the official year.

31. *Repairing the Bundarrah and Water-course of Bhadne.* —Similar repairs and improvements to the above, with the addition of cutting into a slope of forty-five degrees (45°) the sides of a portion of the water-course in deep cutting, with perpendicular sides, as these were continually falling in by the action of the water, and choking the water-course. Great progress towards completion before the close of the official year.

47. *Annual Repairs to the made Roads and Bridges for* 1848-49.—The usual periodical repairs have been executed at a cost of Rupees fourteen thousand and twenty-eight, Annas eight, and Pies eleven (14,028-8-11), being in excess of the estimated cost by the amount of Rupees three hundred and ten, Annas eight, and Pies eleven (310-8-11). This excess was principally caused by severe injuries to the road by floods while under repair. The amount of annual sanction per mile for the made moorum portion of the line, viz. a hundred (100) Rupees, is not sufficient for the repair with proper material of the whole line of made road, of which few portions run through soil favourable for road making. Every attempt was made during the repairs to supply as good material as could be obtained, without causing an excess in the estimate, but the want of effective superintendence prevented the most good being got out of the sanctioned amount, by slight repairs to the better portions affording larger expenditure of money and

moorum of a good description on the worse portions of the line, the general rule with Native superintendents being to lay a coat of the best material to be obtained near at hand, of uniform thickness over the whole line.

50. *Improvements to the Agra Road, from Chandore Ghaut to Scindwa Pass.*—Executed on a monthly sanction of Rupees one thousand (1,000). During the past official year, the improvements to this line of road in the Province of Candeish have been as follows:—

Between Chandore and Malligaum. Very little has been done to this portion of the line, as it has for some time past been completely bridged, with the exception of the large river the Girna; and though its original construction, by embanking in some portions with inferior material, and subsequently repairing annually with the same, is not to be commended, there is no portion that can be said urgently to require reconstruction, while so many miles of road remain unconstructed. An improvement to the ford at the Girna River ferry has been made, by blasting away the rock on the right bank of the river, to save the bottom of the ferry-boat from injury, the cost of which has been Rupees fifty-seven, and Annas fifteen (57-15-0).

Between Malligaum and Dhoolia. 51. A similar but more extensive work of blasting has been completed, at a cost of Rupees one hundred and ninety-one, Annas two, and Pies ten (191-2-10), in the rocky bed of the right bank of the River Moosum, to form a safer landing-place for the ferry-boat, the rock excavation being now filled with sand and deposit. Nothing more in the way of improvement has been executed to this portion of the line of road, which, though it has the general defect throughout the greater part of its length of not being embanked to a sufficient height above the surrounding country, to admit of efficient drainage and sufficient water-way for the bridges on the line, may be said to be a very fair piece of moorum road. It is bridged but half way to Dhoolia, but, with the exception of a large bridge over the

Boree River, of which the design is before Government, cannot be said to be urgently in want of completion with bridges throughout.

Between Dhoolia and Soanghier.

52. The piece of road between Dhoolia and Soanghier is over favourable soil, and may be said to be the best portion of the whole line in that respect, short lengths of course excepted. It is in this portion, however, that the greatest delay to the dawk occurs during floods, on account of the numerous nullahs, few of which have been bridged. Nothing has been done towards the improvement of this portion of the line during the past official year beyond the usual periodical repairs.

Between Soanghier and Sirpoor.

53. The portion of the roadway between Soanghier and Sirpoor, and for three or four miles beyond that place, is undoubtedly the worst on the line, and most in need of immediate attention and improvement. From the point where the good moorum soil terminates in the deep black soil of the valley of the River Taptee, a new piece of road was commenced after the monsoon of 1848, and carried for a length of rather more than three (3) miles, at a total cost of Rupees ten thousand and thirty-five, Annas six, and Pies three (10,035-6-3), including the cost of a small bridge of three (3) arches, each of six (6) feet span, which was constructed for a sum of Rupees eight hundred and fifty, Annas three, and Pies nine (850-3-9), near a place called Sarwa, about the middle of the new piece of road. More could have been done during the past official year in the prolongation of this new piece of road, but as there was reason to fear an excess of the annual sanction of twelve thousand (12,000) Rupees in carrying on a piece of road at a cost of between three thousand (3,000) and four thousand (4,000) Rupees a mile, the work was suspended, to be resumed in succeeding years, should it be considered advisable. The great cost of this portion of the line of road may be easily explained by the fact of no road-making material being near at hand. The annual repairs of this road when completed will

never be properly executed under three hundred (300) Rupees a mile.

Between Sirpoor and Scindwa.

54. The road beyond Sirpoor is, as before stated, equally bad, and equally in need of immediate improvement, for about three or four miles from Sirpoor, but nothing has been done to it beyond its usual periodical repairs as a fair weather road. There is a great deal to be done in the way of bridging, excavating, and embanking, on the portion of the road between Sirpoor and the foot of the Scindwa Ghaut, but this can be deferred with propriety until the other bad portion is made into a moorum road. Above the Scindwa Ghaut is another bad portion of the line, but nothing has yet been done towards its improvement.

55. *Completing with Bridges the Road between Jhorgu and Nusseerabad.*—The works on this road were not all completed by the end of the official year, but the following bridges and breast walls had been completed:—

1st. A bridge of one (1) segmental arch, twenty (20′) feet span, and three feet four inches (3′-4″) rise (arc of 60 degrees), has been completed over a large nullah between Borekoond and Babra, at a cost of Rupees nineteen hundred and seven, Annas five, and Pies seven (1,907-5-7).

2nd. A bridge of three (3) segmental arches, thirty (30) feet span, and ten (10) feet rise, occupying a total length between outsides of abutments of a hundred and twenty-two (122) feet, breadth under soffit of arches seventeen (17) feet, and with a clear roadway of fourteen (14) feet, has been completed near Babra, at a cost of Rupees six thousand five hundred and sixty-one, Anna one, and Pies four (6,561-1-4).

3rd. Two (2) bridges, each of one (1) segmental arch, eight (8) feet span, and one (1) foot rise, (arc of 60°,) with a breadth under soffit of arch of seventeen (17) feet, and a clear width of roadway of fourteen (14) feet, have been constructed, one near Dholee, and the other near Bola, at a total cost of Rupees one thousand and fifty-one, Annas eleven, and Pies four (1,051-11-4),

4th. A bridge of three (3) segmental arches, twenty (20) feet span, and three feet four inches (3′-4″) rise, (arc of 60°,) with a breadth under soffit of arches of seventeen (17) feet, and a clear width of roadway of fourteen (14) feet, has been completed over a large nullah at Bola, at a total cost of Rupees three thousand three hundred and forty-four, Anna one, and Pies eight (3,344-1-8).

5th. A breast wall, four hundred and fifty (450) feet in length, mean thickness three feet five inches (3′-5″), and mean height three feet ten inches (3′-10″), has been constructed across the rocky bed of a branch of the Boree River, not far from Oondeerkheira, at a cost of Rupees twelve hundred and thirty-one, Anna one, and Pies four (1,231-1-4); and,

6th. A breast wall, one hundred and sixty-three (163) feet in length, three (3) feet in thickness, and four feet two inches (4′-2″) in mean height, has been constructed across the Oondeerkheira Nullah, at a cost of Rupees three hundred and twenty, Annas fifteen, and Pies eight (320-15-8); the object of the above breast walls being to secure a soft sandy roadway over the deposit that will accumulate in their rear, in place of the former difficult and destructive passage across the uneven rocky beds of the river and nullah; a very good arrangement, when the construction of a bridge is objectionable on account of its expense, or impracticable without heavily embanked approaches.

There remains but little more of the estimated work to be completed on this line, of which an account will be given in the next Annual Report.

No. 1101 of 1849-50.

GENERAL DEPARTMENT.

To

THE SECRETARY MILITARY BOARD,

Bombay.

SIR,

I have the honor to forward the Annual Report of Works in the Northern Provinces for the year ending 30th April 1849.

Statement of the Sums expended by each Officer under the Superintending Engineer, Northern Provinces, from 1st May 1848 to 30th April 1849.

Names of Officers.	In the Military Department.	In the General Department.	In the Judicial Department.	In the Revenue Department.	In the Territorial Department.	In the Political Department.	In the Ecclesiastical Department.	Total.
	Rs. a. p.	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*
Major Goodfellow, Captain Hebbert, and Lieutenant Kennedy, Executive Engineers, Surat Division..	1,269 5 4	6,500 9 10	2,682 3 6	3,714 10 5	545 1 10	0 0 0	65 3 0	14,777 1 11
Lieutenant Dickinson, Executive Engineer, Ahmedabad Division.....	11,728 0 9	25,228 12 6	2,912 5 2	2,044 8 9	2,347 9 5	1,100 3 1	1,987 12 0	47,349 3 8

Captain Evans and Lieut. Brown, Acting Executive Engineers, Deesa Division	28,800	1	8	26	9	8	0	0	0	0	0	0	0	0	0	0	0	0	588	2	10	29,414	14	2
Lieutenant Wilkinson, Captains MacGregor and Taylor, in Charge of Public Works at Rajkote	2,831	2	8	0	0	0	0	0	0	0	0	0	0	0	0	371	0	0	593	3	0	3,795	2	8
Lieut. Moyle, in Charge of Public Works at Bhooj	1,456	9	3	0	0	0	0	0	0	0	0	0	0	0	0	122	0	0	172	14	11	1,751	8	2
Total	46,085	3	8	31,756	0	0	5,594	8	8	5,759	3	2	2,892	11	3	1,593	3	1	3,07	0	9	97,087	14	7

Statement showing the Cost of Engineering and General Superintendence of each Officer under the Superintending Engineer, Northern Provinces, from 1st May 1848 to 30th April 1849.

Names of Officers.	Expense of Establishment per annum.			Expenditure.			Rate per cent.
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*	
Major Goodfellow, Captain Hebbert, and Lieutenant Kennedy, Executive Engineers, Surat Division	8,842	5	7	14,777	1	11	59$\frac{4}{7}$
Lieutenant Dickinson, Executive Engineer, Ahmedabad Division	11,867	11	3	47,349	3	8	25$\frac{1}{8}$
Captain Evans and Lieutenant Brown, Acting Executive Engineers, Deesa Division	6,147	8	4	29,414	14	2	20$\frac{9}{10}$
Lieutenant Wilkinson, Captains MacGregor and Taylor, in Charge of Public Works at Rajcote	242	0	0	3,795	2	8	6$\frac{3}{8}$
Lieutenant Moyle, in Charge of Public Works at Bhooj	158	0	0	1,751	8	2	9
Total	27,257	9	2	97,087	14	7	28$\frac{1}{4}$

During the last year no works of general or permanent professional interest have been executed, and there do not appear to have been any facts recorded worthy of publication.

From the outlay at Ahmedabad, there have been Rupees 21,537 expended on local and general improvements. From that at Deesa, Rupees 13,209 have been expended on the improvement of the Aboo Road, and buildings for the use of the sick Europeans on the Mountain.

I have the honor to be, &c.,

(Signed) W. G. HEBBERT, Captain,
Acting Superintending Engineer, N. P.

Superintending Engineer's Office, N. P.,
Surat, 10th October 1849.

Statement of Expenditure in the Construction and Repair of Public Works in the Road and Tank Department, from the 1st of May 1847 to the 30th of April 1848.

Bandorah, 12th January 1850.

Names of Works.	Amount.			Total.		
Works connected with the Communication of the Country.	*Rs.*	*a.*	*p.*	*Rs.*	*a.*	*p.*
Constructing a piece of road connecting Karlee Travellers' Bunglow with main line.....	128	15	3			
Rolling mail road for 1847-48.....	678	2	4			
Minor works.....	13	9	2			
Repairing bridge on mail road near Sungum..	306	14	1			
Annual repairs to mail road for 1846-47....	6,593	6	1			
Bridging and metalling the new Akoordee road.	18,028	12	0			
Securing railing posts of Welesly Bridge....	192	0	0			
Annual repairs to flying bridges for 1847-48..	239	0	0			
Removing centering of the Poonah bridge..	1,352	4	0			
Annual repairs to bridges and drains on cross roads for 1847-48.....	9	9	5			
Annual repairs to bridges to cross roads for 1847-48.....	4,228	0	0			
Annual repairs to bridges to mail road for 1847-48.....	10,262	0	0			
Annual repairs to bridges and drains on mail road for 1847-48.....	806	0	0			
Constructing junction road between Dapooree and Holker's Bridge.....	3,828	10	6			
Renewing parapet wall of the 2nd bridge on main road beyond the Sungum.....	690	0	0			
Annual repairs to fair weather roads for 1847-48.....	158	0	0			
Annual repairs to flying bridges at Koregaum and Seroor for 1847-48.....	812	1	3			
Marine stores expended on ditto.....	1,258	10	10			
Cost of working the flying bridges.....	1,252	0	0			
Annual repairs to roads, bridges, &c. for 1847-48, in the Poonah Collectorate.....	9,882	10	3			
Constructing a bridge over the Kondapoor nullah.....	2,640	0	0			
Constructing a bridge over Wussudwadee nullah.....	2,585	0	0			
Making up four more steel traversers.....	12	11	6			
Transmission of Engineer stores.....	1	5	0			
Removing the flying bridge from Poonah, and re-erecting it at Khurradee.....	1,931	0	0			
Carried forward, Rs.....	67,890	9	8			

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	67,890	9	8			
Removing one of the flying bridges at Seroor; dismantling and repairing one at Koregaum.	740	7	5			
Petty repairs and petty charges in the Poonah Collectorate	169	3	5			
Driving an experimental pile in the Seena river	151	13	4			
Annual repairs to roads, bridges, &c. for 1847-48, in the Nuggur Collectorate.....	4,575	8	5			
Petty repairs and petty charges in the Nuggur Collectorate	168	2	5			
Constructing a new road between Patus and Indapoor	94,224	1	7			
Annual and special repairs to Nagpoor dawk line.....	3,368	2	10			
Maintenance of ferry men and hawlers on Nagpoor dawk line	3,570	2	8			
New works on Nagpoor dawk line	5,148	13	4			
Clearing a new line of road from the village of Vulludgaum to Aurungabad.....	101	13	0			
Petty repairs of sheds for the boats at the Godavery and Poonah rivers	14	2	8			
Annual repairs to Nagpoor dawk line for March and April 1848.....	574	13	0			
Constructing Thul Ghaut experimental and lower portions of roads.....	52	6	10			
Constructing Thul Ghaut new road	48,184	2	2			
Annual repairs to main road from Chandore Ghaut to Thul Ghaut for 1845-46.....	3	0	0			
Annual repairs to main road from Chandore Ghaut to Thul Ghaut for 1846-47.....	39	6	9			
Annual repairs to main road from Chandore Ghaut to Thul Ghaut for 1847-48.....	10,003	1	2			
Annual repairs to the experimental and lower portions completed on that Ghaut new road for 1847-48	438	15	9			
A cut across the angle formed by a sharp turn in a nullah near the village of Kokungaum, between Nassick and Chandore, for the protection of main road.....	257	15	9			
Annual repairs to Pimpree and Sinnur cross roads for 1847-48.....	1,441	0	1			
Annual repairs to bridges and drains on main road for 1847-48	50	11	10			
Petty repairs.....	2	8	4			
Annual repairs to bridges and drains on the Sinnur cross road for 1847-48.....	131	13	2			
Annual repairs to ferry boats and flying bridges in the Nassick Sub-Collectorate for 1847-48.....	57	15	2			
Carried forward, Rs.....	2,41,360	14	9			

Names of Works.	Amount.			Total.		
	Rs	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	2,41,360	14	9			
Petty repairs.....	65	7	8			
Clearing away rubbish from the gutter and roadway on the Thul Ghaut road, near the Rurtonda Pass.....	98	0	2			
Repairing and improving the bridge at Gokhurwah	1,372	6	1			
Annual repairs to main road for 1847-48 ...	9,070	8	11			
Special repairs to main road for 1847-48	221	7	8			
Annual repairs to road in the Cantonment at Bhewndy for 1847-48	196	13	0			
Special repairs to road between Tannah and Purlick	118	3	4			
Annual repairs to main road from Sion Causeway to Colsette ferry for 1847-48.....	5,117	0	0			
Annual repairs to main road from Bandorah to Ghore Bunder for 1847-48	5,359	0	0			
Annual repairs to main road from Trombay to Sion Causeway for 1847-48.....	873	0	0			
Annual repairs to main road from Chemboor to the Mhual boundary for 1847-48.....	166	0	0			
Erecting bridge at Erla Parla, on the Bandorah and Ghore Bunder road.....	4,500	0	0			
Constructing a new road from Coorla to the 20th mile-stone, near Tannah	1,500	0	0			
Surveying the Esplanade at Tannah	7	8	0			
Annual repairs to mail road from Panwell to Khopolee for 1847-48	6,686	2	5			
Annual repairs to bridge and drains on mail road for 1847-48	170	5	11			
Annual repairs to main road from Nagotna to Mahableshwur for 1847-48	5,025	0	0			
Annual repairs to cross roads in the Northern Conkun for 1847-48	3,163	3	8			
Annual repairs to cross roads in the Southern Conkun for 1847-48	1,329	2	10			
Completing the works of the Panwell Bunder platform.....	1,591	11	5			
Re-constructing Nudhel bridge, on mail road..	773	12	4			
Re-constructing a bridge on Cullian road....	220	15	0			
Minor works	67	3	3			
				2,89,053	14	5
Tanks, Bunds, and Wells.						
Deepening a well on mail road, near Wursolee.	79	3	8			
Constructing sluices in the Dhurrun at Kullud.	43	14	11			
Clearing and building parapet wall to the well at Shikarpoor, on main road between Poonah and Seroor.....	176	0	0			
Carried forward, Rs.....	299	2	7	2,89,053	14	5

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	299	2	7	2,89,053	14	5
Sinking and building a well at Egutpooree, between Nassick and Thul Ghaut.....	13	5	4			
Clearing out and building up an old well at Bhewndy.....	96	14	10			
Clearing out and effecting certain improvements to a tank at Colsette	450	14	0			
Improving the tank at Khurdee.....	782	10	1			
Clearing out tank and well at Woundall.....	137	11	3			
				1,780	10	1
Buildings.						
Annual repairs to furniture of Travellers' Bungalows for 1846-47.....	31	14	2			
Annual repairs to the Travellers' Bungalows for 1847-48.....	974	6	9			
Constructing new pendalls on Bombay road..	7,224	4	0			
Constructing Mamledar's Cutcherry at Khair..	450	12	8			
Annual repairs to the Travellers' Bungalows in the Poonah Collectorate for 1847-48....	280	0	0			
Annual repairs to the Travellers' Bungalows in the Ahmednuggur Collectorate for 1847-48.....	1,263	0	0			
Annual repairs to the Travellers' Bungalows in the Nassick Sub-Collectorate.....	304	10	6			
Petty repairs.....	18	12	1			
Petty repairs to the Military buildings at Nassick for 1847-48	30	10	7			
Making certain additions required to the Military buildings at Nassick	93	1	3			
Petty works.....	22	0	0			
Petty repairs.....	28	10	3			
Annual repairs to store-room at Bhewndy for 1847-48	19	12	0			
Annual repairs to the Travellers' Bungalows for 1847-48	613	3	4			
Repairing furniture of the Travellers' Bungalows for 1847-48	24	0	0			
Constructing new and repairing weather screens, and also constructing new gate to the compound of the Church at Tannah, for 1847-48.....	222	1	2			
Annual repairs to the Church at Tannah....	6	14	0			
Petty repairs to the Church at Tannah.....	73	9	5			
Constructing a weighing shed near the Custom house at Tannah.....	768	7	1			
Annual repairs to the buildings in the Custom Department at Tannah for 1847-48	360	4	11			
Carried forward, Rs.....	12,810	6	2	2,90,834	8	6

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	12,810	6	2	2,90,834	8	6
Special repairs to the buildings in the Custom Department at Tannah for 1847-48	570	2	8			
Annual repairs to the Quarter Guard-room and Hospital.....	51	4	3			
Emergent repairs to the Quarter Guard-room at Bhewndy	44	8	2			
Annual repairs to Civil Department Hospital for 1847-48.....	84	0	0			
Annual repairs to the Travellers' Bungalow and out-houses for 1847-48.	69	0	0			
Annual repairs to the Engineer store-room and out-houses for 1847-48.....	38	0	0			
Annual repairs to permanent and temporary pendalls	390	0	0			
Erecting a new Hospital for the Military Department at Tannah.....	2,840	0	0			
Removing Tannah Church bell from tower of Church to Bombay, bringing back, and replacing.....	35	0	0			
Colouring and whitewashing Civil Hospitals at Tannah.....	38	8	0			
Annual repairs to the Travellers' Bungalow in the Southern Conkun for 1847-48.....	43	4	9			
Annual repairs to the Travellers' Bungalow in the Northern Conkun for 1847-48.....	231	5	2			
Constructing a Cutcherry for the Mahalkurry at Oorun.....	1,100	0	0			
				18,345	7	2
Total, Company's Rupees Three lacks, Nine thousand One hundred and seventy-nine, Fifteen Annas, and Eight Pies.....				3,09,179	15	8

(Signed) W. D. GRAHAM, Bt. Captain,
Superintendent of Roads and Tanks.

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Statement showing the Amount expended by each Officer of the Road and Tank Department, from the 1st of May 1847 to the 30th April 1848.

Names of Officers.	Roads and Bridges.	Tanks, Wells, and Bunds.	Buildings.	Total.
	Rs. a. p.	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*
Captain Cowper	47,515 2 10	79 3 8	8,681 5 7	56,275 12 1
Mr. Scott..	26,180 9 10	219 14 11	1,543 0 0	27,943 8 9
Mr. Armistead	94,224 1 7	.. .. ..	.. .. ..	94,224 1 7
Captain Dennis	12,777 15 6	.. .. ..	.. .. ..	12,777 15 6
Lieutenant Chapman.	60,728 8 8	13 5 4	497 12 8	61,239 10 8
Lieutenant Scott....	10,959 3 10	1,330 6 11	2,754 3 0	15,043 13 9
Lieutenant Mungavin	17,640 11 4	.. .. ..	3,494 8 0	21,135 3 4
Captain Pruen	19,027 8 10	137 11 3	1,374 9 11	20,539 14 0
Total.....	2,89,053 14 5	1,780 10 1	18,345 7 2	3,09,179 15 8

(Signed) W. D. GRAHAM, Bt. Captain,
Superintendent of Roads and Tanks.

Return showing the Expense of Engineering and Superintendence with reference to actual Outlay.

Names of Officers.	Expense of Establishment per annum.	Expenditure.	Rate per cent.
	Rs.	*Rs.*	
Captain Cowper	8,855	56,275	15¾
Mr. Scott	10,605	27,943	37 1/16
Mr. Armistead	3,527	94,224	3¾
Captain Dennis	7,430	12,777	58⅛
Lieutenant Chapman	9,257	61,239	15⅛
Lieutenant Scott	9,939	15,043	66 1/16
Lieutenant Mungavin.....	8,272	21,135	39⅛
Captain Pruen	8,176	20,539	39¾

Total Expenditure during the year ..... Rs. 3,09,179
Cost of Establishments 66,061
Average rate per cent..... 21½

(Signed) W. D. GRAHAM, Bt. Captain,
Superintendent of Roads and Tanks.

NOTE.—Captain Dennis is Post Master as well as in charge of the Nagpoor Dawk Line, and the allowances drawn by that Officer should not therefore be all debited to the Road and Tank Department, especially as his Engineering duties are confined to one line of works.

(Signed) W. D. GRAHAM, Bt. Captain,
Superintendent of Roads and Tanks.

Statement of Expenditure in the Construction and Repairs of Public Works in the Road and Tank Department, from the 1st of May 1848 to the 30th of April 1849.

Names of Works.	Amount.			Total.		
Works connected with the Communication of the Country.	*Rs.*	*a.*	*p.*	*Rs.*	*a.*	*p.*
Annual repairs to mail road for 1847-48	4,274	0	0			
Annual repairs to bridges and drains on mail road for 1847-48	714	0	0			
Rolling mail road for 1847-48	31	4	8			
Annual repairs to cross roads for 1847-48....	175	0	0			
Annual repairs to roads, bridges, &c., for 1847-48.....	1,465	1	11			
Annual repairs to flying bridges at Koregaum and Seroor, for 1847-48.....	82	14	9			
Annual repairs to roads, bridges, &c. for 1847-48.....	639	13	8			
Bridging, draining, and metalling the new Akoordee road	11,193	5	4			
Junction road between Dapooree and Holkur bridge	2,978	7	3			
Annual repairs to mail road for 1848-49	8,142	7	1			
Annual repairs to cross roads for 1848-49....	4,385	5	9			
Rolling mail road.....	416	12	3			
New road on the South side of Bheema, leading from cross road to the town of Khair..	34	10	8			
Annual repairs to bridges and drains on mail road for 1848-49.....	1,063	8	0			
Minor works.....	278	1	3			
Annual repairs to fair weather roads for 1848-49.....	158	0	0			
Annual repairs to flying bridges for 1848-49..	227	15	3			
Constructing a branch road from Daporee bridge to Government House	700	0	0			
Renewing one of the flying bridges at Seeroor, and repairing at Koregaum.....	1,502	13	6			
Annual repairs to the flying bridges at Koregaum for 1848-49	1,007	0	0			
Annual repairs to roads, bridges, &c. for 1848-49.....	8,073	15	3			
Minor works.....	235	15	8			
Annual repairs to roads, bridges, and drains for 1848-49	3,853	0	7			
Minor works	4	0	0			
Annual repairs to works on Nagpoor Dawk line for 1848-49	7,500	2	5			
Maintenance of ferrymen and haulers for 1848-49.....	3,628	8	1			
Carried forward, Rs.....	62,766	3	4			

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	62,766	3	4			
New works for 1848-49	3,188	4	3			
Replacing the retaining walls with three drains for the masonry bridge at Hewrah, No. 8..	374	0	0			
Petty repairs to sheds for the roads at the Godavery and Poonah rivers, &c.....	11	5	10			
Constructing the Thull Ghaut experimental portion of road.....	1,840	1	3			
Completing the Thull Ghaut new road	56,118	13	1			
Improvement of Chandore Ghaut	128	9	9			
Annual repairs to main road from Chandore Ghaut to Thull Ghaut for 1845-46	165	9	4			
Annual repairs to main road from Chandore Ghaut to Thull Ghaut for 1847-48	2,354	10	10			
Annual repairs to main road from Chandore Ghaut to Thull Ghaut for 1848-49	12,690	1	9			
Repairs to the experimental and lower portions completed on the Thull Ghaut new road for 1848-49.....	332	11	5			
Rebuilding and repairing the retaining walls of the Chandore Ghaut, also building portions of parapet walls of the Chandore Ghaut for 1848-49	3,886	14	4			
Annual repairs to Sinnur and Pimpree cross roads for 1847-48	198	7	10			
Annual repairs to Sinnur and Pimpree cross roads for 1848-49	1,755	5	1			
Annual repairs to road constructing between the Camp and the town of Nassick	115	15	4			
Petty repairs to Sinnur cross road.....	18	9	8			
Annual repairs to bridges and drains on main road for 1846-47	156	3	9			
Annual repairs to bridges and drains on main road for 1847-48.....	91	1	4			
Annual repairs to bridges and drains on main road for 1848-49.....	87	7	5			
Minor works.....	39	15	11			
Constructing bridge over Pharasherry river, at Pimpulgaum.....	6,737	10	9			
Annual repairs to bridges and drains on Sinnur cross road for 1848-49.	21	14	1			
Annual repairs to flying bridges for 1847-48.	130	15	6			
Annual repairs to flying bridges for 1848-49.	208	4	0			
Petty repairs to flying bridges.....	295	2	3			
Constructing new line of road from Kussorah to Khurdee for 1848-49....	25,161	2	6			
Special repairs to main road....	104	14	0			
Annual repairs to main road for 1848-49....	9,470	15	5			
Annual repairs to road in the Cantonment at Bhewndy for 1848-49	117	0	10			
Carried forward, Rs.....	1,88,568	6	10			

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	1,88,568	6	10			
Repairing the bridge at Gokhurwa.....	47	13	1			
Constructing a platform at the port of Bhewndy	476	7	1			
Repairs to the steps of the Kasseylee Bunder.	43	7	8			
Special repairs to the road between Tannah and Persick.....	306	0	0			
Constructing a road between Coorla and the 20th mile-stone, near Tannah.....	475	13	3			
Annual repairs to main road from Sion Causeway to Colsette Ferry for 1848-49.	3,073	8	0			
Annual repairs to main road from Bandora to Ghora Bunder for 1848-49	4,738	8	0			
Annual repairs to main road from Trombay to Sion Causeway	599	4	0			
Annual repairs to main branch road from Chemboor to Mhoul boundary.....	124	8	0			
Completing the Bhandoop road	2,745	4	10			
Annual repairs to mail road from Khopolee to Panwell for 1848-49	2,999	8	5			
Annual repairs to bridges and drains from Khopolee to Panwell for 1848-49....	41	10	6			
Annual repairs to main road from Nagotna to Mahableshwur, for 1848-49.....	4,667	7	6			
Annual repairs to cross roads in the Northern Conkan for 1848-49.	3,406	4	9			
Annual repairs to cross roads in the Southern Conkan, for 1848-49.....	1,635	15	2			
Reconstructing Needhul bridge, on mail road.	210	0	2			
Constructing road from Poona to Indapoor	31,604	12	3			
				2,45,784	11	6
Tanks, Wells, and Bunds.						
Clearing out and building up an old well at Bhewndy	37	10	8			
Clearing out and effecting certain improvements to a tank at Colsette	834	8	0			
Improving tank at Khurdee	3,908	5	1			
Sinking a new well at Pudgah, near the Travellers' Bungalow.....	159	13	1			
Building a facing to prevent leakage to the bund of Kussara tank.....	99	12	0			
Sinking a well at Egutpooree, between Nassick and Egutpooree.....	300	0	0			
Petty repairs to Wuddalee well on main road.	50	0	0			
Clearing water holes below the Layna Hills, near main road.....	33	10	6			
Minor works	27	15	6			
				5,451	10	10
Carried forward, Rs.....	.....			2,51,236	6	4

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Buildings.						
Brought forward, Rs.....				2,51,236	6	4
Constructing new pendalls on Bombay road..	7,974	9	4			
Constructing Mamledar's Kutcherry at Khair.	2,724	3	4			
Annual repairs to Travellers' Bungalow for 1847-48.....	91	9	3			
Annual repairs to Travellers' Bungalow for 1848-49.....	343	12	3			
Constructing new Travellers' Bungalow at Akoordee.....	2,026	10	2			
Annual repairs to Travellers' Bungalows for 1847-48.....	127	0	0			
Annual repairs to Travellers' Bungalows for 1848-49	399	0	0			
Annual repairs to Travellers' Bungalows for 1848-49.....	955	0	0			
Annual repairs to Travellers' Bungalows for 1848-49, in Northern Conkan.....	9	4	0			
Annual repairs to Travellers' Bungalows for 1848-49, in Southern Conkan.....	8	14	0			
Constructing new pendalls at Chowke and Panwell.....	11,630	0	0			
Emergent repairs to Mamledar's Kutcherry at Panwell.....	904	6	4			
Minor works.....	111	13	11			
Annual repairs to Store-room at Bhewndy for 1848-49.....	19	14	2			
Annual repairs to Travellers' Bungalows for 1848-49.....	608	7	4			
Repairing and fixing the door of one of the bath rooms of Travellers' Bungalow at Kussarah.....	0	9	3			
Constructing new and repairing old weather screen, and also constructing a new gate to the compound wall of the Church at Tannah.	68	5	10			
Annual repairs to the Church at Tannah for 1848-49	576	10	2			
Tarring railing surrounding the burial-ground of the Church at Tannah	50	7	0			
Repairing venetians of the windows of the Tannah Church.....	10	5	6			
Repairing plaster of the Tannah Church....	79	13	4			
Annual repairs to the buildings in the Custom Department at Tannah for 1848-49.....	711	7	9			
Repairing the 1st Assistant Collector's bungalow at Kelwa, Mahim.....	150	14	7			
Repairing plaster of the buildings in the Custom Department at Tannah.....	50	7	3			
Repairing hips and ridges of the buildings in the Custom Department at Tannah.....	9	12	0			
Carried forward, Rs.....	29,643	4	9			

Names of Works.	Amount.			Total.		
	Rs.	*a.*	*p.*	*Rs.*	*a.*	*p.*
Brought forward, Rs.....	29,643	4	9	2,51,236	6	4
Making props and fixing furls, &c. to the bamboo mat frames of the buildings in the Custom Department at Tannah for 1848-49.	3	8	11			
Dammering gutters of the buildings in the Custom Department at Tannah for 1848-49.	15	9	6			
Annual repairs to Quarter Guard room and Hospital of the Native Veteran Battalion at Bhewndy for 1848-49	328	1	9			
Repairing hips and eaves of the Hospital of the Native Veteran Battalion at Bhewndy.....	12	1	1			
Whitewashing the Hospital of the Native Veteran Battalion at Bhewndy.....	21	10	0			
Remaking floor of the Hospital of the Native Veteran Battalion at Bhewndy.....	19	6	5			
Annual repairs to the Civil Hospital at Tannah.	79	0	0			
Annual repairs to the Travellers' Bunglows..	34	0	0			
Annual repairs to the Engineer Store-room, &c.	104	0	0			
Annual repairs to the Military buildings....	346	0	0			
Constructing railing and fixing glass windows in the Military Hospital at Tannah.....	307	0	0			
Minor works.....	190	7	10			
Annual repairs to Travellers' Bungalows for 1847-48.....	30	3	2			
Annual repairs to Travellers' Bungalows for 1848-49.....	204	9	1			
Petty repairs.....	83	9	8			
Petty works	5	9	2			
Improvement in the Police and Civil Hospital at Nassick.....	42	1	5			
Repairs to Military buildings for 1847-48-49, and petty repairs.....	213	7	11			
Cleaning the privies of the Nassick Jail, by means of water from an old well, also a paved washing place to provide for the prisoners	238	7	1			
				31,922	1	9
Grand Total, Rupees Two Lacs Eighty-three thousand One hundred and Fifty-eight, Annas Eight, and Pie One.....				2,83,158	8	1

Statement showing the Amount expended by each Officer of the Road and Tank Department, from the 1st of May 1848 to the 30th April 1849.

Names of Officers.	Roads and Bridges.	Tanks, Wells, and Bunds.	Buildings.	Total.
	Rs. a. p.	*Rs. a. p.*	*Rs. a. p.*	*Rs. a. p.*
Captain Cowper	51,637 8 10	0 0 0	14,641 12 4	66,279 5 2
Mr. Armistead	31,604 12 3	0 0 0	0 0 0	31,604 12 3
Captain Dennis	14,702 4 7	0 0 0	0 0 0	14,702 4 7
Lieutenant Chapman	87,374 8 8	411 10 0	817 15 6	88,604 2 2
Lieutenant Scott	35,421 12 7	5,040 0 10	2,737 7 10	43,199 5 3
Mr. Scott	12,062 14 1	0 0 0	1,060 7 10	13,123 5 11
Lieutenant Boddam	12,980 14 6	0 0 0	12,664 6 3	25,645 4 9
Total, Rupees....	2,45,784 11 6	5,451 10 10	31,922 1 9	2,83,158 8 1

Return showing the Expenses of Engineering and Superintendence, with reference to Actual Outlays.

Names of Officers.	Expense of Establishment per Annum.	Expenditure.	Rate per Cent.
	Rs.	*Rs.*	*Rs.*
Captain Cowper	16,806	66,279	$25\frac{1}{4}$
Mr. Armistead	3,681	31,604	$11\frac{2}{3}$
Captain Dennis	7,002	14,702	$47\frac{3}{7}$
Lieutenant Chapman..	6,148	88,604	$6\frac{9}{17}$
Lieutenant Scott-	9,877	43,199	$22\frac{6}{7}$
Mr. Scott....	8,618	13,123	$65\frac{1}{3}$
Lieutenant Boddam..	6,558	25,645	$25\frac{1}{7}$

Total Expenditure during the year.....Rs. 2,83,158
Cost of Establishments, ditto..... ,, 58,690
Average Rate per Cent..... ,, $20\frac{1}{7}$

NOTE.—Captain Dennis is Post Master as well as in Charge of the Nagpoor Dawk Line, and the allowances drawn by that Officer should not therefore be all debited to the Road and Tank Department, especially as his Engineering duties are confined to one line of works.

NOTE.—The original Establishment kept up for the superintendence of the Chimboor Causeway, and the employment of prisoners, has not as yet been reduced, which is the cause of the very high rate of superintendence.

(Signed) W. D. GRAHAM, Bt. Captain.
Superintendent of Roads and Tanks.

List of Estimates prepared by the Officers of the Road and Tank Department, and submitted for Sanction, between the 1*st May* 1848 *and the* 30*th April* 1849.

Estimates.	Amount. Rs. a. p.
Captain Cowper.	
Estimate for constructing new ferry boats on the rivers Bhama and Bheema, on the Narraingaum road	660 0 0
Estimate for constructing Moonsiff's Court-house at Wurgaum.	1,276 0 0
Making certain alterations and repairs to the old palace at Phoolshare	1,013 11 3
Rebuilding the Eastern approach of the Shickarpore bridge	6,134 0 0
Estimate for constructing a Mamledar's Kutcherry at Khurkallah	3,574 0 0
Making certain additions to the Poonah Travellers' Bungalow	199 0 0
Constructing additional staging pendalls on the road from Poonah to Panwell	31,692 0 0
Repairing and rendering serviceable a well at Lownee	445 0 0
Constructing branch road to Government House, Dapooree	1,508 0 0
Mr. Sub-Conductor Armistead.	
Construction of the Patus and Poonah road A	1,02,000 0 0
Ditto ditto ditto B	1,08,966 0 0
Ditto ditto ditto C	1,31,221 0 0
Restoring the bund of Kassoordee tank	39,656 1 4
Repairing embankment of ditto ditto	21,562 3 5
Constructing tank at Yewut	3,070 0 0
Statement exhibiting the probable reduction in the estimated cost of drains, bridges, &c. for the Patus and Poonah road	8,592 0 0
Lieutenant Chapman.	
Estimate for the approaches to the proposed bridge over the Undwell river, accompanying plan	14,787 0 0
Estimate of rebuilding and repairing the retaining walls of Chandore Ghaut, accompanying sections	3,887 0 0
Estimate for cleaning the privies of the Nassick Jail by means of water from an old well, and accompanying plan	226 0 0
Fixing the railing of Undwell river, on one side of the Nassurdee causeway	482 0 0
Removing of certain defects in the Police and Civil Hospital at Nassick	44 0 0
Building bridges over two nullahs, one between the Kadoo river and Pimpulgaum, and the other near Konkungaum, on the main road, in the Nassick Sub-Collectorate	1,824 0 0
Carried forward, Rs.	4,82,819 0 0

Estimates.	Amount.		
	Rs.	*a.*	*p.*
Brought forward, Rs.....	4,82,819	0	0
Building a dip across a nullah on the connecting road between the Camp and Nassick, accompanying sketch	234	0	0
Fixing a permanent site, and for making approaches and providing standands, ramps, &c. to the Godavery flying bridge at Nassick....	5,326	0	0
LIEUTENANT SCOTT.			
Supplementary estimate for extending the facing to the Kussara tank	86	0	0
Estimate for constructing three new weather screens, and repairing the remainder; also constructing one new gate to the compound at the Tannah Church..	294	0	0
Estimate for sinking a new well at Pudgha, near the Travellers' Bungalow, with plan	163	0	0
Estimate for constructing a new Custom House at Oomergaum, with plan	1,134	0	0
Estimate for repairing cut stone steps, &c. to the Kusseylee bunder, with plan	56	0	0
Estimate for constructing a new horse boat for the Dantewra ferry, with plan	1,145	0	0
Estimate for repairing the 1st Assistant Collector's Bungalow at Kelwa Mahim, in the Bassein District, with plan	1,433	0	0
Estimate for erecting a bund, and cutting a channel for the purpose of stopping the encroachment of the Oomergaum river on the town of Oomergaum, with plans	12,804	0	0
Estimate for building two new boats for the use of the passsengers at the Colsette ferry, with plan	1,066	0	0
Estimate for constructing a teakwood gate, with the posts, to the compound of the Native Veteran Battalion Hospital at Bhewndy, with plan..	50	0	0
Estimate for constructing a defaulters' room to the present Quarter Guard of the Native Veteran Battalion at Bhewndy.	193	0	0
MR. SCOTT.			
Estimate for erecting fence on two sides of the Military Hospital at Tannah, and fixing glazed windows	395	0	0
Statement for completing the Bhandoop road	15,400	0	0
Estimate for repairing the bungalow on the Tannah Fort rampart, to be converted into a Jail Hospital	1,851	0	0
Estimate for constructing a road at Bandora, leading to the hill of Senhora de Monte	6,240	0	0
Estimate for erecting three permanent pendalls for the use of the Detachment at Tannah	3,693	0	0
Estimate for erecting two new defaulters' rooms joined to the Quarter Guard at Tannah	214	0	0
Carried forward, Rs.....	5,34,596	0	0

Estimates.	Amount.		
	Rs.	*a.*	*p.*
Brought forward, Rs.....	5,34,596	0	0
Estimate for substituting plank ceiling for the choonam ones to the verandah of the Collector's House at Tannah	1,074	0	0
Estimate for repairing the injuries sustained by the Bhandoop road	905	0	0
Estimate for repairing the double boat plying between Tannah and Kulwa	397	0	0
LIEUTENANT BODDAM.			
Supplementary estimate for constructing Nedhul bridge, on mail road	256	0	0
Estimate for emergent repairs to the Mamledar's Kutcherry at Panwell	1,356	0	0
CAPTAIN DENNIS.			
Estimate for new works on Nagpoor Dawk line....	3,188	4	3
Replacing the retaining walls, with three drains, for the masonry bridge at Hewra, No. 8	374	0	0
ANNUAL REPAIRS.			
Estimate for annual repairs for roads, &c. for the year 1849-50.	1,10,907	0	4
Estimate for annual repairs for buildings..	6,216	0	0
Grand Total, Rupees.....	6,59,269	4	7

(Signed) W. D. GRAHAM, Bt. Captain,
Superintendent of Roads and Tanks.

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on 10 January, 2019